Set Name side by side	Query	Hit Count	Set Name result set
DB=USPT,PGPB,JPAB,EPAB,DWPI; PLUR=YES; OP=ADJ			
L26	l24 and L25	20	L26
L25	l4 and l5 and l6	443	L25
L24	l22 and L23	60	L24
L23	(504/237 OR 504/250 OR 504/337 OR 504/365 OR 504/206).CCLS.	769	L23
L22	l20 and L21	97	L22
L21	amine$1 same (surfactant$1 or (surface active))	33684	L21
L20	l13 and L19	137	L20
L19	l2 same l7	4510	L19
L18	L17 not l16	3	L18
L17	l14 and (agricultur$ or agrichemical$ or agrochemical$ or horticultur$)	4	L17
L16	L10 and l14	1	L16
L15	l2 and L14	1	L15
L14	l1 and L13	51	L14
L13	alkylpolyglycoside$1 or alkylpolyglucoside$1 or polyglycoside$1 or polyglucoside$1 or alkylglycoside$1 or alkylglucoside$1	6231	L13
L12	l9 not L11	21	L12
L11	l9 and L10	3	L11
L10	504.clas.	15242	L10
L9	L3 not l8	24	L9
L8	l3 and L7	4	L8
L7	l4 or l5 or L6	7212	L7
L6	fomesafen$1	829	L6
L5	paraquat or (dimethyl adj3 bipyridinium)	2086	L5
L4	glyphosate OR (roundup or spasor or muster or glifonox or glycel) OR (phosphonomethylglycine or ((phosphonomethyl or (phosphono methyl)) glycine))	5978	L4
L3	l1 and L2	28	L3
L2	herbicid$	67600	L2
L1	jeffamine or jefamine	2840	L1

END OF SEARCH HISTORY

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Search Results - Record(s) 1 through 4 of 4 returned.

☐ 1. Document ID: US 20030104943 A1

L8: Entry 1 of 4 File: PGPB Jun 5, 2003

PGPUB-DOCUMENT-NUMBER: 20030104943
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20030104943 A1

TITLE: Novel surfactants and formulations

PUBLICATION-DATE: June 5, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Lennon, Patrick J.	Webster	MO	US	
Chen, Xiangyang	Chesterfield	MO	US	
Arhancet, Graciela B.	Creve Coeur	MO	US	
Glaenzer, Jeanette A.	University City	MO	US	
Gillespie, Jane L.	St. Louis	MO	US	
Graham, Jeffrey A.	Wildwood	MO	US	
Becher, David Z.	Point Court	MO	US	
Wright, Daniel R.	St. Louis	MO	US	
Agbaje, Henry E.	St. Louis	MO	US	
Xu, Xiaodong C.	Valley Park	MO	US	
Abraham, William	Wildwood	MO	US	
Brinker, Ronald J.	Ellisville	MO	US	
Pallas, Norman R.	Florissant	MO	US	
Wideman, Al S.	St. Louis	MO	US	
Mahoney, Martin D.	St. Peters	MO	US	
Henke, Susan L.	Webster Groves	MO	US	

US-CL-CURRENT: 504/206

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw. Desc | Image

☐ 2. Document ID: US 20030022791 A1

L8: Entry 2 of 4 File: PGPB Jan 30, 2003

PGPUB-DOCUMENT-NUMBER: 20030022791
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20030022791 A1

TITLE: Method of microencapsulating an agricultural active having a high melting point and uses for such materials

PUBLICATION-DATE: January 30, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Asrar, Jawed	Chesterfield	MO	US	
Ding, Yiwei	St. Louis	MO	US	

US-CL-CURRENT: 504/116.1; 71/64.07

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw. Desc | Image

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☑ 3. Document ID: US 6420311 B1

L8: Entry 3 of 4 File: USPT Jul 16, 2002

US-PAT-NO: 6420311
DOCUMENT-IDENTIFIER: US 6420311 B1

TITLE: Polyether diamine--based surfactant adjuvants and compositions thereof

DATE-ISSUED: July 16, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Stridde; Howard Meyer	Austin	TX		
Ashrawi; Samir S.	Austin	TX		

US-CL-CURRENT: 504/365; 504/127, 504/206

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw. Desc | Image

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☐ 4. Document ID: ZA 200108770 A WO 200059302 A1 AU 200033107 A EP 1164845 A1 BR 200009515 A HU 200200706 A2 CZ 200103534 A3 CN 1370043 A JP 2002541075 W

L8: Entry 4 of 4 File: DWPI Mar 26, 2003

DERWENT-ACC-NO: 2000-686883
DERWENT-WEEK: 200327

TITLE: Low foaming agrochemical compositions, used to severely damage or kill unwanted plants, comprise agrochemical ingredients e.g. glyphosate and adjuvants that enhance the activity of the agrochemicals

INVENTOR: BEAN, M J; CUTLER, J L ; SEVILLE, A G ; RAMSAY, J L

PRIORITY-DATA: 1999GB-0007669 (April 1, 1999)

PATENT-FAMILY:

PUB-NO	PUB-DATE	LANGUAGE	PAGES	MAIN-IPC
ZA 200108770 A	March 26, 2003		033	A01N000/00
WO 200059302 A1	October 12, 2000	E	021	A01N025/30
AU 200033107 A	October 23, 2000		000	A01N025/30
EP 1164845 A1	January 2, 2002	E	000	A01N025/30
BR 200009515 A	April 16, 2002		000	A01N025/30
HU 200200706 A2	July 29, 2002		000	A01N025/30
CZ 200103534 A3	November 13, 2002		000	A01N025/30
CN 1370043 A	September 18, 2002		000	A01N025/30
JP 2002541075 W	December 3, 2002		025	A01N025/30

INT-CL (IPC): A01 N 0/00; A01 N 25/30; A01 N 41/06; A01 N 43/40; A01 N 57/20

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
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Terms	Documents
13 and L7	4

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L8: Entry 3 of 4 File: USPT Jul 16, 2002

DOCUMENT-IDENTIFIER: US 6420311 B1
TITLE: Polyether diamine--based surfactant adjuvants and compositions thereof

Abstract Text (1):
Surfactants that are expected to further improve the bioefficacy of herbicides. The surfactants comprise esterified alkoxylated polyether diamines, alkoxylated polyether diamines, and mixtures thereof. The present invention also provides for herbicide compositions that contain the surfactants of the present invention. The herbicide compositions comprise a herbicidal active ingredient, a surfactant of the present invention, and optionally, one or more formulation aids. The present invention additionally provides for a method of controlling unwanted weeds or vegetation using the herbicide compositions of the present invention.

Brief Summary Text (2):
This invention relates to surfactants, and, more particularly, to surfactants that enhance the bioefficacy of herbicides, and to herbicide compositions comprising such surfactants.

Brief Summary Text (4):
Herbicide compositions are often characterized according to the identity of the active ingredient, and by the mode by which the active ingredient causes vegetation necrosis. Regardless of the active ingredient, most herbicides cause vegetation necrosis by interfering with one or more vital biological processes essential to the vegetation's survival. Yet, before the active ingredient of a herbicide can interfere with such biological processes, the active ingredient must somehow be absorbed into the vegetation. Unfortunately, this absorption is often hindered by the chemical nature of the active ingredient.

Brief Summary Text (5):
Accordingly, in addition to active ingredients, most herbicide compositions also comprise other components, commonly termed adjuvants, that enhance the performance and absorption of the active ingredient. One class of adjuvants that is frequently used is surfactants. Surfactants are useful in herbicide compositions because they tend to both enhance the absorbing properties of the active ingredient, as well as facilitate application of the herbicide.

Brief Summary Text (6):
The literature discloses various classes of surfactants, including alkoxylated diamines. However, the literature appears to lack any reference to the use of alkoxylated polyether diamines or esterified alkoxylated polyether diamines as suitable herbicide adjuvants. It is expected that both alkoxylated polyether diamines and esterified alkoxylated polyether diamines will function to improve the bioefficacy of herbicide compositions containing such surfactants. Accordingly, the present invention is directed toward surfactant adjuvants that include alkoxylated polyether diamines, esterified alkoxylated polyether diamines, and mixtures thereof, herbicide compositions comprising such surfactant adjuvants, and a method of controlling unwanted vegetation using such herbicide compositions.

Brief Summary Text (8):
The present invention provides for surfactants that are expected to further improve the bioefficacy of herbicides. The surfactants comprise alkoxylated polyether diamines (I), esterified alkoxylated polyether diamines (IIa) or (IIb), or mixtures

thereof, with the following general structure: ##STR1##

Brief Summary Text (11):
The present invention also provides for herbicide compositions that contain a surfactant of the present invention. The herbicide compositions comprise a herbicidal active ingredient, a surfactant of the present invention, and optionally, one or more formulation aids. The herbicide compositions of the present invention are expected to have a reduced tendency to cause eye and skin irritation.

Brief Summary Text (12):
The present invention additionally provides for a method of controlling unwanted weeds or vegetation using the herbicide compositions of the present invention.

Brief Summary Text (14):
The present invention relates to surfactants that are expected to enhance the bioefficacy of herbicides, herbicide compositions comprising such surfactants, and a method of controlling unwanted weeds or vegetation using the herbicide compositions of the present invention. The surfactants of the present invention are expected to enhance the bioefficacy of herbicides because they have twice the amine content as traditional herbicide surfactants (i.e. tallowamine ethoxylates). This increased amine content will likely enhance the ability of the herbicide to penetrate the tissue of the vegetation, thereby increasing the bioefficacy of the herbicide. In addition, the surfactants of the present invention are expected to have improved handling characteristics, including a lower volatility, due to the polyether "interior" structure of the surfactants. Further, when added to glyphosate solutions, the surfactants of the present invention produce cloud points at or above about 65.degree. C., the commercial standard for glyphosate herbicide solutions.

Brief Summary Text (15):
The surfactants of the present invention may be used in conjunction with any number of herbicidal active ingredients, including, but not limited to, various salts of glyphosate and gluphosinate. However, the use of the surfactants of the present invention with glyphosate is of particular interest because glyphosate is probably the most widely used herbicide.

Brief Summary Text (16):
Glyphosate, or N-phosphonomethylglycine, is a broad-spectrum herbicide that is useful on essentially all annual and perennial plants, including, grasses, broad-leaved weeds, and woody plants. Glyphosate promotes plant necrosis by inhibiting aromatic amino acid biosynthesis. By inhibiting aromatic amino acid synthesis, and thereby protein synthesis, glyphosate initially suppresses plant growth, which is soon followed by plant necrosis.

Brief Summary Text (17):
In its free acid form, glyphosate has a low water solubility. As such, water-based glyphosate compositions typically contain a water soluble salt of glyphosate, such as the isopropylamine salt. For example, many commercially available herbicide compositions contain the water soluble mono-isopropylamine salt of glyphosate. Glyphosate, and various water soluble derivatives of glyphosate are available from numerous manufactures.

Brief Summary Text (25):
After preparation, the resulting alkoxylated polyether diamine surfactants of the present invention may then be blended with one or more formulation aids before being combined with a herbicide. Such formulation aids may include neutralizing agents, water, anti-freeze agents, or mixtures thereof. The neutralizing agents may include, but are not limited to, hydrochloric acid or sulfuric acid, carboxylic acids with less than about twenty carbon atoms, sulfonic acids, acid sulfates, acid phosphate esters, and/or acid carboxylates. A sufficient amount of a neutralizing agent should be added to the surfactant to neutralize any residual basicity (i.e to achieve a pH of about 7.0). The anti-freeze agents may include, but are not limited to ethylene glycol, diethylene glycol, propylene glycol, and polyethylene glycols.

Brief Summary Text (26):
The relative amount of formulation aids that should be blended with the alkoxylated

polyether diamine surfactants of the present invention will depend on a variety of factors, including the nature of the herbicide to be blended with the surfactant solution, the proposed mode of application of the final herbicide formulation, the nature of the vegetation to be treated, etc.

Brief Summary Text (36):
The resulting esterified alkoxylated polyether diamine surfactants of the present invention may then be blended with one or more formulation aids before being combined with a herbicide. Such formulation aids may include neutralizing agents, water, anti-freeze agents, or mixtures thereof. The neutralizing agents may include, but are not limited to, hydrochloric acid or sulfuric acid. A sufficient amount of a neutralizing agent should be added to the surfactant to neutralize any residual basicity (i.e to achieve a pH of about 7.0). The anti-freeze agents may include, but are not limited to ethylene glycol, diethylene glycol, propylene glycol, and polyethylene glycols.

Brief Summary Text (37):
The relative amount of formulation aids that should be blended with the esterified alkoxylated polyether diamine surfactants of the present invention will depend on a variety of factors, including the nature of the herbicide to be blended with the surfactant solution, the proposed mode of application of the final herbicide formulation, the nature of the vegetation to be treated, etc.

Brief Summary Text (38):
After preparation, the alkoxylated polyether diamine and esterified alkoxylated polyether diamine surfactant compositions of the present invention, or mixtures thereof, may then be blended with a herbicide. The relative amount of the alkoxylated polyether diamine and/or esterified alkoxylated polyether diamine surfactant compositions of the present invention that should be blended with a herbicide will vary depending on a variety of factors, including the nature of the herbicide, the nature of the vegetation to be treated, the method of application, whether the herbicide is a water-based or a granular formulation, etc. In any case, the resulting herbicide compositions of the present invention should include a herbicidally effective amount of a herbicidal active ingredient, and a sufficient amount of a surfactant composition of the present invention to enhance the effectiveness of the herbicidal active ingredient. The term "herbicidally effective amount" means the amount of herbicide necessary to promote plant necrosis. The term "surfactant composition" means the surfactants of the present invention blended with one or more formulation aids.

Brief Summary Text (39):
The herbicide compositions of the present invention may be prepared as either liquid or solid compositions. Liquid compositions may include solutions ready for immediate application, aqueous concentrates intended to be diluted with water before application, or microencapsulated actives suspended in liquid media. Solid compositions may include, but are not limited to, water dispersible granules, water soluble granules, microencapsulated actives, free-flowing particulate compositions, or granular-based solids that have been compressed into tablets or briquets of any desired size and shape. Optionally, solid compositions may include formulations where the herbicide composition is absorbed onto water soluble or water insoluble inert dry carriers, including, but not limited to, Magnesol.RTM. (commercially available from the Dallas Group of America, Inc., Whitehouse, N.J.).

Brief Summary Text (40):
Accordingly, the herbicide compositions of the present invention may be applied to vegetation as either a liquid or solid composition. Liquid herbicide compositions are typically sprayed on the vegetation to be treated, and typically comprise either liquid concentrates or dissolved or dispersed solid compositions. Liquid compositions may also be injected into, or painted on the truck portion of the vegetation to be treated. Solid granular compositions may be spread on or around the vegetation to be treated.

Brief Summary Text (41):
Herbicide compositions comprising the alkoxylated polyether diamine and/or esterified alkoxylated polyether diamine surfactant compositions of the present

invention are expected to have a reduced tendency to cause eye irritation. Reduced eye irritation is expected because the pH of the alkoxylated polyether diamine and esterified alkoxylated polyether diamine surfactant compositions of the present invention is about 7.0. Because herbicide formulations are often applied by humans, or in locales with humans or animals, reduced eye irritation is a desirable feature in such formulations.

Brief Summary Text (42):
It is understood that variations may be made in the foregoing with departing from the scope of the invention. For example, although the surfactants of the present invention are primarily discussed as being incorporated into water-based herbicide compositions, it is understood that the surfactants of the present invention may also be incorporated into dry granular herbicide formulations. In addition, although the surfactants of the present invention are primarily discussed as being incorporated into glyphosate solutions, the surfactants of the present invention may be incorporated into any number of other herbicide formulations, including, but not limited to, macro and micro emulsions, suspensions, suspension concentrates, and other liquid and solid formulations known to those skilled in the art, to increase the bioefficacy of such herbicides.

Detailed Description Text (8):
Bioefficacy Testing of Glyphosate Solutions Containing the Alkoxylated Polyether Diamine Surfactants of the Present Invention

Detailed Description Text (11):
The surfactant solution prepared in Example 2 is then blended with a glyphosate solution. Rodeo.RTM. is used as the source of glyphosate. (Rodeo.RTM. contains 648 g/L of the mono-isopropylamine salt of glyphosate.) The glyphosate solution is then sprayed on a variety of weeds. The weeds are examined approximately twenty-one days after treatment with the glyphosate solution containing a surfactant of the present invention. The weeds appear to be significantly affected by the treatment, and most appear to be dead.

Detailed Description Text (19):
Bioefficacy Testing of Glyphosate Solutions Containing the Esterified Alkoxylated Polyether Diamine Surfactants of the Present Invention

Detailed Description Text (22):
The surfactant solution prepared in Example 5 is then blended with a glyphosate solution. Rodeo.RTM. is used as the source of glyphosate. (Rodeo.RTM. contains 648 g/L of the mono-isopropylamine salt of glyphosate.) The glyphosate solution is then sprayed on a variety of weeds. The weeds are examined approximately twenty-one days after treatment with the glyphosate solution containing a surfactant of the present invention. The weeds appear to be significantly affected by the treatment, and most appear to be dead.

Other Reference Publication (3):
Publication: Wyrill, J.B., III, et al.: "Glyphosate Toxicity to Common Milkweed and Hemp Dogbane as Influenced by Surfactants" Weed Science, 1977, 25:275-287.

Other Reference Publication (4):
Technical Bulletins--Huntsman Corporation: #1022-59; "Jeffamine D-230 Polyoxypropylenediamine" 1988 (2 pages) #1100-1096; "XTJ-502 Poly(osyethylene)diamine" 1996 (2 pages) #1021-698; "Jeffamine D-400 Polyoxypropylenediamine" 1998 (2 pages) #1011-1194; "Jeffamine EDR-148 Triethyleneglycoldiamine" 1994 (6 pages).

Other Reference Publication (7):
"EXTOXNET" Pesticide Information Profile "Glyphosate" Website: //128.84.37.85/profiles/extox (4 pages).

Other Reference Publication (9):
"The Use of Soybean Oil as a Crop Oil for the Application of Herbicides" Slife, F.W. et al., Website://stratsoy.ag.uiuc.edu (2 pages).

Other Reference Publication (10):
"Herbicide Additives" Harzler, R.G., et al., Website:
www.pme.iastate.edu/PAT.pcic/additives (3 pages).

CLAIMS:

1. A herbicide composition that comprises: a. a herbicidally effective amount of a herbicidal active ingredient; and b. a sufficient amount of a surfactant component that enhances the effectiveness of the herbicidal active ingredient, wherein the surfactant component comprises either alkoxylated polyether diamines (I), esterified alkoxylated polyether diamines (IIa) or (IIb) , or mixtures thereof, with the following general structure: ##STR9## where R.sub.1, R.sub.2, R.sub.3, and R.sub.4 are each independently hydrogen, CH.sub.3, or CH.sub.2 CH.sub.3 ; a, b, and c each vary from zero to about forty, subject to the proviso that at least one of a, b, or c is not zero; R.sub.5 and R.sub.6 are each independently a straight or branched chain alkenyl group with from about two to about six carbon atoms; d, e, f, g, h, i, j, and k each vary from zero to about twenty-two, subject to the proviso that at least one of d, e, f, g, h, i, j, and k is not zero; each R.sub.7 is independently either a hydrogen or has the following general structure: ##STR10## where each R.sub.8 is independently a linear or branched alkyl or alkenyl with less than about twenty-two carbon atoms; and, R.sub.9 is a bridging alkyl or alkenyl with less than about twenty-two carbon atoms.

2. The composition of claim 1, wherein the herbicidal active ingredient comprises glyphosate or a salt thereof.

7. A method of killing or controlling weeds or unwanted vegetation comprising the step of applying a herbicidally effective amount of the composition of claim 1 to the foliage or tissue of the weeds or unwanted vegetation.

8. A herbicide composition that comprises: a. a herbicidally effective amount of glyphosate or a salt thereof; and b. a sufficient amount of a surfactant component that enhances the effectiveness of glyphosate or a salt thereof, wherein the surfactant component comprises either alkoxylated polyether diamines (I), esterified alkoxylated polyether diamines (IIa) or (IIb) , or mixtures thereof, with the following general structure: ##STR11## where R.sub.1, R.sub.2, R.sub.3, and R.sub.4 are each independently hydrogen, CH.sub.3, or CH.sub.2 CH.sub.3 ; a, b, and c each vary from zero to about forty, subject to the proviso that at least one of a, b, or c is not zero; R.sub.5 and R.sub.6 are each independently a straight or branched chain alkenyl group with from about two to about six carbon atoms; d, e, f, g, h, i, j, and k each vary from zero to about twenty-two, subject to the proviso that at least one of d, e, f, g, h, i, j, and k is not zero; each R.sub.7 is independently either a hydrogen or has the following general structure: ##STR12## where each R.sub.8 is independently a linear or branched alkyl or alkenyl with less than about twenty-two carbon atoms; and, R.sub.9 is a bridging alkyl or alkenyl with less than about twenty-two carbon atoms.

13. A method of killing or controlling weeds or unwanted vegetation comprising the step of applying a herbicidally effective amount of the composition of claim 8 to the foliage or tissue of the weeds or unwanted vegetation.

14. A surfactant for increasing the bioefficacy of a herbicide, wherein the surfactant comprises either alkoxylated polyether diamines (I), esterified alkoxylated polyether diamines (IIa) or (IIb) , or mixtures thereof, with the following general structure: ##STR13##

where R.sub.1, R.sub.2, R.sub.3, and R.sub.4 are each independently hydrogen, CH.sub.3, or CH.sub.2 CH.sub.3 ; a, b, and c each vary from zero to about forty, subject to the proviso that at least one of a, b, or c is not zero; R.sub.5 and R.sub.6 are each independently a straight or branched chain alkenyl group with from about two to about six carbon atoms; d, e, f, g, h, i, j, and k each vary from zero to about twenty-two, subject to the proviso that at least one of d, e, f, g, h, i, j, and k is not zero; each R.sub.7 is independently either a hydrogen or has the following general structure: ##STR14##

where each R.sub.8 is independently a linear or branched alkyl or alkenyl with less than about twenty-two carbon atoms; and, R.sub.9 is a bridging alkyl or alkenyl with less than about twenty-two carbon atoms.

16. A surfactant for increasing the bioefficacy of a herbicide that comprises: a. alkoxylated polyether diamines (I), esterified alkoxylated polyether diamines (IIa) or (IIb) , or mixtures thereof, with the following general structure: ##STR15## where R.sub.1, R.sub.2, R.sub.3, and R.sub.4 are each independently hydrogen, CH.sub.3, or CH.sub.2 CH.sub.3 ; a, b, and c each vary from zero to about forty, subject to the proviso that at least one of a, b, or c is not zero; R.sub.5 and R.sub.6 are each independently a straight or branched chain alkenyl group with from about two to about six carbon atoms; d, e, f, g, h, i, j, and k each vary from zero to about twenty-two, subject to the proviso that at least one of d, e, f, g, h, i, j, and k is not zero; each R.sub.7 is independently either a hydrogen or has the following general structure: ##STR16## where each R.sub.8 is independently a linear or branched alkyl or alkenyl with less than about twenty-two carbon atoms; and, R.sub.9 is a bridging alkyl or alkenyl with less than about twenty-two carbon atoms; and b. a formulation aid.

20. The composition of claim 16, wherein the composition has a cloud point greater than about 65.degree. C. when mixed with a herbicidal active ingredient.

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L8: Entry 4 of 4 File: DWPI Mar 26, 2003

DERWENT-ACC-NO: 2000-686883
DERWENT-WEEK: 200327

TITLE: Low foaming agrochemical compositions, used to severely damage or kill unwanted plants, comprise agrochemical ingredients e.g. glyphosate and adjuvants that enhance the activity of the agrochemicals

INVENTOR: BEAN, M J; CUTLER, J L ; SEVILLE, A G ; RAMSAY, J L

PATENT-ASSIGNEE: ZENECA LTD (ZENE), SYNGENTA LTD (SYGN)

PRIORITY-DATA: 1999GB-0007669 (April 1, 1999)

PATENT-FAMILY:

PUB-NO	PUB-DATE	LANGUAGE	PAGES	MAIN-IPC
ZA 200108770 A	March 26, 2003		033	A01N000/00
WO 200059302 A1	October 12, 2000	E	021	A01N025/30
AU 200033107 A	October 23, 2000		000	A01N025/30
EP 1164845 A1	January 2, 2002	E	000	A01N025/30
BR 200009515 A	April 16, 2002		000	A01N025/30
HU 200200706 A2	July 29, 2002		000	A01N025/30
CZ 200103534 A3	November 13, 2002		000	A01N025/30
CN 1370043 A	September 18, 2002		000	A01N025/30
JP 2002541075 W	December 3, 2002		025	A01N025/30

DESIGNATED-STATES: AE AG AL AM AT AU AZ BA BB BG BR BY CA CH CN CR CU CZ DE DK DM DZ EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX NO NZ PL PT RO RU SD SE SG SI SK SL TJ TM TR TT TZ UA UG US UZ VN YU ZA ZW AT BE CH CY DE DK EA ES FI FR GB GH GM GR IE IT KE LS LU MC MW NL OA PT SD SE SL SZ TZ UG ZW AL AT BE CH CY DE DK ES FI FR GB GR IE IT LI LT LU LV MC MK NL PT RO SE SI

APPLICATION-DATA:

PUB-NO	APPL-DATE	APPL-NO	DESCRIPTOR
ZA 200108770A	October 24, 2001	2001ZA-0008770	
WO 200059302A1	March 21, 2000	2000WO-GB01062	
AU 200033107A	March 21, 2000	2000AU-0033107	
AU 200033107A		WO 200059302	Based on
EP 1164845A1	March 21, 2000	2000EP-0911114	
EP 1164845A1	March 21, 2000	2000WO-GB01062	
EP 1164845A1		WO 200059302	Based on
BR 200009515A	March 21, 2000	2000BR-0009515	
BR 200009515A	March 21, 2000	2000WO-GB01062	
BR 200009515A		WO 200059302	Based on
HU 200200706A2	March 21, 2000	2000WO-GB01062	
HU 200200706A2	March 21, 2000	2002HU-0000706	
HU 200200706A2		WO 200059302	Based on
CZ 200103534A3	March 21, 2000	2000WO-GB01062	
CZ 200103534A3	March 21, 2000	2001CZ-0003534	
CZ 200103534A3		WO 200059302	Based on
CN 1370043A	March 21, 2000	2000CN-0808219	
JP2002541075W	March 21, 2000	2000JP-0608879	
JP2002541075W	March 21, 2000	2000WO-GB01062	
JP2002541075W		WO 200059302	Based on

INT-CL (IPC): A01 N 0/00; A01 N 25/30; A01 N 41/06; A01 N 43/40; A01 N 57/20

ABSTRACTED-PUB-NO: WO 200059302A
BASIC-ABSTRACT:

NOVELTY - An agrochemical composition comprises a agrochemical active ingredient and an adjuvant (I).

DETAILED DESCRIPTION - An agrochemical composition comprises a agrochemical active ingredient and an adjuvant of formula (I).

R1, R2 = H, lower alkyl or X'-(R3O)a-R4-;

R3O = ethoxy, propoxy, butoxy or their random or block mixtures;

R4 = 1-4C alkylene;

X' = OH or 1-6C alkoxy;

X = OH, 1-6C alkoxy, R5R6N, R5R6NR7, or a group of formula (i);

R5, R6 = H, lower alkyl or X'-(R3O)a-R4-;

R7 = 1-4C alkylene;

R10, R11, R14, R15 = H, lower alkyl or X'-(R3O)a-R4-;

R8, R12 = 1-4C alkyl;

R9, R13, R21 = 1-6C alkylene;

R16-R20 = H or lower alkyl;

d = 0 or 1;

a = 1-400; and

a+b+c = 3-400 if X = (i).

ACTIVITY - Herbicidal.

MECHANISM OF ACTION - None given.

USE - The compositions are used to severely damage or kill unwanted plants (claimed).

ADVANTAGE - The compositions contain adjuvants that enhance the activity of the agrochemicals, particularly water-soluble agrochemicals. The compositions exhibit excellent low-foaming properties when the composition is incorporated into spray tanks and during transportation and spraying. Potassium glyphosate was applied at 500 g glyphosate acid equivalent/ha to Abutilon theophrasti plants grown in a glasshouse. All treatments were made up in deionized water and applied using a tracksprayer with a 11002 nozzle at a spray application volume of 200 l/ha. All treatments were replicated four times. After spraying, the plants were laid out in a glasshouse and maintained at 24 deg. C by day and 19 deg. C by night. Jeffamine (RTM: propoxylated diamine) adjuvants were used in a proportion of 0.2 weight/volume %. A visual assessment of percentage control (0% = unaffected; 100% = complete kill) was carried out 16 days after treatment. Treatment control without adjuvant provided 37% control of Abutilon theophrasti. Ten treatments containing different Jeffamine (RTM) adjuvants gave % control values ranging from 70-93 %.

ABSTRACTED-PUB-NO: WO 200059302A
EQUIVALENT-ABSTRACTS:

CHOSEN-DRAWING: Dwg.0/0

DERWENT-CLASS: A25 A97 C03 C07
CPI-CODES: A10-E08A; A10-E18; A12-W04C; A12-W12C; C04-C03C; C05-B01G; C14-V01;

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☐ 1. Document ID: US 20020136773 A1

L11: Entry 1 of 3 File: PGPB Sep 26, 2002

PGPUB-DOCUMENT-NUMBER: 20020136773
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20020136773 A1

TITLE: Novel microcapsules

PUBLICATION-DATE: September 26, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Scher, Herbert Benson	Moraga	CA	US	
Chen, Jinling	Randolph	NJ	US	
Mazeaud, Isabelle	San Francisco	CA	US	
Kanne, David Braun	Corte Madera	CA	US	
Shirley, Ian Malcolm	Binfield		GB	
Wade, Philip	Runcorn		GB	
Padget, John Christopher	Frodsham		GB	
Waller, Anne	Wokingham		GB	

US-CL-CURRENT: 424/497; 504/359

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw Desc | Image

☐ 2. Document ID: US 5120349 A

L11: Entry 2 of 3 File: USPT Jun 9, 1992

US-PAT-NO: 5120349
DOCUMENT-IDENTIFIER: US 5120349 A

TITLE: Microcapsule having temperature-dependent permeability profile

DATE-ISSUED: June 9, 1992

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Stewart; Ray F.	Redwood City	CA		
Greene; Lawrence C.	Boulder Creek	CA		
Bhaskar; Ravi K.	Lawrence	KS		

US-CL-CURRENT: 504/234; 264/4.32, 264/4.33, 264/4.7, 424/408, 428/402.21,

428/402.22, 428/402.24, 504/342, 504/347, 504/359, 514/87, 514/963

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw Desc | Image

☑ 3. Document ID: US 4155892 A

L11: Entry 3 of 3 File: USPT May 22, 1979

US-PAT-NO: 4155892
DOCUMENT-IDENTIFIER: US 4155892 A

TITLE: Polyurethane thickeners for aqueous compositions

DATE-ISSUED: May 22, 1979

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Emmons; William D.	Huntingdon Valley	PA		
Stevens; Travis E.	Ambler	PA		

US-CL-CURRENT: 524/507; 504/323, 504/325, 504/360, 514/788, 524/591

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw Desc | Image

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Terms	Documents
l9 and L10	3

Display Format: - Change Format

Previous Page Next Page

L11: Entry 2 of 3 File: USPT Jun 9, 1992

DOCUMENT-IDENTIFIER: US 5120349 A
TITLE: Microcapsule having temperature-dependent permeability profile

Abstract Text (1):
The microcapsules of the invention are comprised of crystallizable polymers which are preferably side-chain crystallizable polymers or cross-linked, side-chain crystallizable polymers having a specific first order transition point or "melt" temperature. The polymers are caused to form microcapsules and thereby encapsulate one or more compounds generally referred to herein as an active ingredient such as a herbicide, insecticide, fungicide, or fertilizer. The polymer of the microcapsule surrounds the active ingredient separating it from the outside environment. Crystallizable polymers used herein have temperature-dependent permeabilities with respect to a given component such that this component is kept out of contact with the active ingredient at a temperature below a given first order transition point and (due to increased permeability) is allowed to contact the active ingredient at a temperature at or above the transition point. The permeability of the polymer is not only temperature-dependent but reversible. The microcapsules are less than 200 microns in median diameter, more generally less than 100 microns in median diameter and preferably less than 50 microns in median diameter. By varying the polymer and reactants used in the formation of the microcapsules, the release rate and timing of the release of active ingredient from the microcapsule can be temperature controlled to obtain the various objects, advantages and features of the present invention.

Brief Summary Text (18):
The microcapsules of the invention are comprised of crystallizable polymers which have a specific T.sub.m or "melting" point as defined herein and are preferably side-chain crystallizable polymers or cross-linked, side-chain crystallizable polymers. The polymers are formed into microcapsules and thereby coat one or more ingredients generally referred to herein as an active ingredient such as a herbicide, insecticide, fungicide, fertilizer or drug. The polymer of the microcapsule (which may be a solid or a hollow sphere) surrounds the active ingredient separating it from the outside environment. Crystallizable polymers used herein have temperature-dependent permeabilities with respect to a given component such that this component is kept out of contact with the active ingredient at a temperature below a given first order transition point (T.sub.m) and (due to increased permeability) is allowed to contact the active ingredient at a temperature at or above the transition point. The microcapsules can be formulated to hold the active ingredient until a first order transition point is reached at which point the active ingredient is released due to the greatly increased permeability.

Detailed Description Text (5):
The microcapsules are comprised of intelligent polymers formed into microcapsules, thereby positioning the active ingredients inside a polymer barrier having specific and variable permeabilities with respect to liquids or gases present in the surrounding environment. The polymers are intelligent in that they have specific "melt" points which result in permeabilities which may be radically and reversibly changed by temperature changes. By using different types of polymers and various temperatures, it is possible to create a microcapsule which adjusts to various parameters such as (1) release rates of components, such as pesticides, herbicides, fungicides, fertilizers and the like, and (2) reaction rates between components inside and outside the capsules. Accordingly, the microcapsules can be designed to best preserve the amount (via reaction rates), color, quality and/or reactivity of

the material. The intelligent polymers are temperature responsive in that they are comprised of crystalline polymers, preferably side-chain crystallizable polymers which are designed and formulated so as to provide a material which is dynamic in nature, that is, changing depending upon the temperature to which it is exposed. The polymeric materials can be designed so that they are substantially impermeable to a given liquid or gas at a temperature below a given phase transition point or "melt" point and highly permeable to the same liquid or gas at a temperature above the transition temperature.

Detailed Description Text (27):
The above disclosure relates largely to a specific description of the crystalline polymers used in making the microcapsules of the invention. This extensive description has been put forth in that the essence of the present invention relies on the use of such crystalline polymers in microcapsules. These polymers may be combined with any given active ingredient in the formation of the microcapsules. For example, a range of different catalysts can be encapsulated and allowed to seep out and take effect only at a given temperature. However, agricultural uses are preferred and in connection therewith it is preferable that the active ingredient be a compound or composition and/or mixture of compounds and compositions which promote, inhibit or in some way effect the growth rate of a plant or insect. For example, various herbicides, fungicides, fertilizers and insecticides can be incorporated in the microcapsule as the active ingredient and used in connection with agriculture in order to promote plant growth and/or inhibit insect growth. An important aspect of the invention includes placing microcapsules of the invention in the soil surrounding plants (or on the surface of plants) so as to improve the ability of the plants to grow and produce a higher yield of crops. The microcapsule polymers are critical in obtaining this result in that the polymers are adjusted so that their permeability with respect to the active ingredient or solvent for the active ingredient such as water is restricted so that the active ingredient (e.g., fertilizer) will not permeate or be leached out of the microcapsule below a given "melt" temperature. This "melt" temperature is generally a temperature at which seed germination is undesirable. When the temperature for seed germination is reached, the permeability increases and water will leach the fertilizer out the microcapsules and thereby improve plant growth. Since water cannot permeate the microcapsule at the lower temperatures, the fertilizer cannot be leached out. Thus, the microencapsulation of the fertilizer makes it possible to use smaller amounts of fertilizer to achieve the same results. Smaller amounts are possible in that no fertilizer is wasted at lower temperatures during which time the seeds have not germinated.

Detailed Description Text (28):
By encapsulating fertilizer, it is possible to obtain a number of advantages. For example, seeds can be planted and fertilizer applied at the same time. The fertilizer will not be leached from the soil at a point too early for the plants to take advantage of the fertilizer. Further, in that less fertilizer need be applied, there are economic and environmental advantages. Similar statements can be made with respect to the use of other active ingredients such as herbicides. An important aspect of the present invention is agricultural soil having dispersed therein microcapsules comprised of crystalline polymers which incorporate an active ingredient which active ingredient is capable of promoting of inhibiting the growth of plants and/or insects. Another aspect of the invention involves a plant having dispersed thereon microcapsules of crystalline polymer having incorporated therein an active ingredient in the form of insecticide.

Detailed Description Text (40):
Capsules were prepared by dissolving 0.25 g of this polymer in a mixture of 0.75 g of diazinon (the active ingredient), 2 ml of dichloromethane and 0.1ml of ethanol and dispersed into 75 ml of 0.5% polyvinyl alcohol solution maintained at room temperature in a beaker. Mechanical stirring was carried out for one hour and an amine was added and stirring was maintained for 12 hours at which time the solution was examined. Capsules with a size of 50 to 200 microns were present. These capsules maintained their shape when the aqueous solution was allowed to evaporate. The capsules were further hardened by addition of 2 drops of Jeffamine T-403 (produced by Texaco). Virtually no unencapsulated diazinon was observed. The release rate of a sample of capsules was measured.

Detailed Description Text (45):
Trifluralin (the active ingredient) was encapsulated using C16 acrylate/10% acrylic acid by the following procedure: 0.3 g of C16 acrylate/10% acrylic acid was combined with 0.70 g trifluralin and 2.0 ml of methylene chloride and mixed until homogeneous. This solution was dispersed in water containing 0.25% polyvinyl alcohol using an overhead stirrer, at a temperature of 20.degree. C. A few minutes after the initial dispersion step, 0.2 g of Jeffamine T-403 was added to the solution, and mixing was continued for 3 hours. The temperature was then increased to 50.degree. C. and 0.216 g of triethylene tetramine was added to the solution. This solution was then allowed to cool to room temperature, and the capsules were filtered, rinsed and then stored slightly wet.

Detailed Description Text (52):
The general procedure is as follows: 0.22 grams of the SCC polymer are mixed with 0.75 grams of diazinon and heated until a homogenous solution is obtained. 0.03 grams of papi(papi 135, Dow Chemical Co.) are then added to this solution. The resulting mixture is then dispersed in 75 grams of water containing 0.5 grams of polyvinyl alcohol at a temperature of 40 to 60.degree. C., using an overhead stirrer or Waring.TM. blender. This yields a particle size range of from 1 to 400 microns depending on the type of agitation used. After the desired particle size is obtained 0.03 grams of a multifunctional amine (Jeffamine T-403 or other multifunctional amine) are added to the solution with gentle mixing and allowed to mix for 3 hours to complete the reaction.

Detailed Description Text (56):
6) 0.11 g C16 Acrylate/5% acrylic acid +0.11 g C16 Acrylate+0.75 g diazinon, 0.27 grams of Papi 27 dispersed in a water solution as above and then 0.03 g of Jeffamine added.

Detailed Description Text (57):
7) 0.11g C16 Acrylate/5% acrylic acid+0.11 g C16 Acrylate/5% maleic anhydride, 0.27 grams of Papi 27+0.75 g diazinon, dispersed in a water solution as above and the 0.03 g of Jeffamine added.

Detailed Description Text (59):
acrylate (Dow Chemical), 0.75 grams diazinon, dispersed in a water solution as above and then 0.03 grams Jeffamine T-403 added.

Detailed Description Text (60):
9) 0.40 grams of C16 Acrylate/5% 2-isocyanatoethylmethacrylate copolymer, 0.60 g diazinon dispersed into a water surfactant solution above and cured with 0.04 grams of Jeffamine T-403 added.

Detailed Description Text (64):
Using a similar process as described in the above examples, trifluralin was encapsulated with isocyanate and a hexadecylacrylate acrylic acid copolymer. Methylcellulose solution (0.2%) was used in place of polyvinyl alcohol solution and the reaction was carried out at 60.degree. C. 0.03 grams of Jeffamine T-403 and 0.03 grams of triethylene tetramine were used to harden the capsule.

Current US Class (4):
504

CLAIMS:

4. The microcapsule as claimed in claim 3, wherein the active ingredient is selected from the group consisting of fertilizers, herbicides, fungicides and insecticides.

End of Result Set

L11: Entry 3 of 3 File: USPT May 22, 1979

DOCUMENT-IDENTIFIER: US 4155892 A
TITLE: Polyurethane thickeners for aqueous compositions

Brief Summary Text (66):
Suitable compounds providing polyether segments also include amino-terminated polyoxyethylenes of the formula NH.sub.2 (CH.sub.2 CH.sub.2 O).sub.x H where x ranges from about 10 to 200. Such compounds are sold under the trademark "Jeffamine", a typical compound being "Jeffamine 2000" of about 2000 molecular weight.

Detailed Description Text (126):
Herbicidal Formulation

Detailed Description Text (127):
To prevent drift and to keep post-emergence herbicide in contact with leafy surfaces, a thickener may be added to a spray tank mix formulation as follows:

Detailed Description Text (129):
Herbicide Spray Mix

Detailed Description Paragraph Table (28):
2,4-D diethanolamine salt (herbicide) 5.0 lbs. Polymeric Thickener of Example 164 4.0 lbs. Sodium lauryl sulfate (27%) 2.5 lbs. Water to make 100 gallons

Current US Class (1):
504

CLAIMS:

8. A composition consisting essentially of (a) water, (b) at least one substance selected from a water insoluble polymeric material, a cosmetically active material, a topical pharmaceutical, and a pesticidal or herbicidal toxicant, and (c) an effective amount of a thickener selected from polymers of Groups A, B and C as follows:

Group A:

a--b.sub.p --E.sub.q --B--E).sub.n 3.sub.r --E.sub.t --A

where each of p, q, r and t independently is zero or 1; at least one of q and r is 1, t is zero when r is zero, and n is at least 1;

provided that, when q is 1, then

(a) each of p, r and t is zero; or

(b) p is zero and each of r and t is 1; or

(c) t is zero and each of r and p is 1; and when q is zero, then r is 1 and each of p and t is zero;

Group B:

[h--e--och.sub.2].sub.s L[Q.sub.v --D.sub.u --E--A).sub.w R.sub.z].sub.m

where L is X, Y or --O--, Q is --CH.sub.2 C.tbd., D is --CH.sub.2 O--, m is 2-4, s is zero to 2, the sum of m and s is 2-4, w is 1-3, and each of u, v and z independently is zero or 1;

and where X is a hydrocarbon radical containing at least 1 carbon atom; and Y is a trivalent radical selected from

--OCONH(CH.sub.2).sub.6 N[CONH(CH.sub.2).sub.6 NHCO--O].sub.2

ch.sub.3 c[ch.sub.2 o--ocnhc.sub.7 h.sub.6 nhco].sub.3 and

CH.sub.3 C[CH.sub.2 O--OCNHC.sub.7 H.sub.6 NHCO].sub.3

provided that,

(a) when L is X, then u and w are each 1, v and z are each zero, m is at least 2, and the sum of m and s is 4;

(b) when L is Y, then u, v and s are each zero, m is 3, w is 2-3, and z is zero or 1; and

(c) when L is --O--, then v and u are each 1, w is 1-3, m is 2 and each of s and z is zero;

and where, in each of the polymers of Groups A and B:

A and R are hydrophobic organic radicals;

B is a divalent hydrophobic group of the structure ##STR11## where G is the residue of an organic di- or triisocyanate, said residue having no remaining unreacted isocyanate groups; and

E is a divalent, hydrophilic, nonionic polyether group; Group C:

A composition prepared by reacting (a) a polyfunctional reactant selected from an organic polyol having at least three hydroxyl groups, an organic polyisocyanate having at least three isocyanate groups, and mixtures thereof; (b) a difunctional reactant selected from an organic diol, an organic diisocyanate, and mixtures thereof, said diol being present in the reaction mixture when said polyisocyanate is present and said diisocyanate being present when said polyol is present; (c) a monofunctional hydroxyl or amino compound in an amount sufficient to cap any unreacted isocyanate remaining from the reaction of reactants (a) and (b) and to prevent gelation of the reaction mixture; and optionally (d) an organic monoisocyanate to cap hydroxyl groups remaining from the reaction of reactants (a) and (b); wherein at least one of said polyol and diol contains at least one water soluble polyether segment of at least 1500 molecular weight, and wherein the sum of the carbon atoms in said isocyanate-containing reactants, said hydroxyl compound and said amino compound is at least 20 and the average molecular weight of the components of the composition is about 10,000-200,000.

15. A method of thickening an aqueous composition consisting essentially of (a) water and (b) at least one substance selected from a water insoluble polymeric material, a cosmetically active material, a topical pharmaceutical, and a pesticidal or herbicidal toxicant, which method comprises incorporating in said dispersion a polymer selected from polymers of Groups A, B and C as follows:

Group A:

a--b.sub.p --E.sub.q --B--E).sub.n B.sub.r --E.sub.t --A

where each of p, q, r and t independently is zero or 1; at least one of q and r is 1, t is zero when r is zero, and n is at least 1;

provided that,

when q is 1, then

(a) each of p, r and t is zero; or

(b) p is zero and each of r and t is 1; or

(c) t is zero and each of r and p is 1; and when q is zero, then r is 1 and each of p and t is zero;

Group B:

[h--e--och.sub.2].sub.s L[Q.sub.v --D.sub.u --E--A).sub.w R.sub.z].sub.m

where L is X, Y or --O--, Q is --CH.sub.2 C.tbd., D is --CH.sub.2 O--, m is 2-4, s is zero to 2, the sum of m and s is 2-4, w is 1-3, and each of u, v and z independently is zero or 1;

and where X is a hydrocarbon radical containing at least 1 carbon atom; and Y is a trivalent hydrophobic radical selected from

--OCONH(CH.sub.2).sub.6 N[CONH(CH.sub.2).sub.6 NHCO--O].sub.2,

ch.sub.3 c[ch.sub.2 o--ocnhc.sub.7 h.sub.6 nhco].sub.3 and

CH.sub.3 CH.sub.2 C[CH.sub.2 O--OCNHC.sub.7 H.sub.6 NHCO].sub.3 ;

provided that,

(a) when L is X, then u and w are each 1, v and z are each zero, m is at least 2, and the sum of m and s is 4;

(b) when L is Y, then u, v and s are each zero, m is 3, w is 2-3, and z is zero or 1; and

(c) when L is --O--, then v and u are each 1, w is 1-3, m is 2 and each of s and z is zero;

and where, in each of the polymers of Groups A and B:

A and R are hydrophobic organic radicals;

B is a divalent hydrophobic group of the structure ##STR13## where G is the residue of an organic di- or triisocyanate, said residue having no remaining unreacted isocyanate groups; and

E is a divalent, hydrophilic, nonionic polyether group;

Group C:

A composition prepared by reacting (a) a polyfunctional reactant selected from an organic polyol having at least three hydroxyl groups, an organic polyisocyanate having at least three isocyanate groups, and mixtures thereof; (b) a difunctional reactant selected from an organic diol, an organic diisocyanate, and mixtures thereof, said diol being present in the reaction mixture when said polyisocyanate is present and said diisocyanate being present when said polyol is present; (c) a monofunctional hydroxyl or amino compound in an amount sufficient to cap any unreacted isocyanate remaining from the reaction of reactants (a) and (b) and to prevent gelation of the reaction mixture; and optionally (d) an organic monoisocyanate to cap hydroxyl groups remaining from the reaction of reactants (a) and (b); wherein at least one of said polyol and diol contains at least one water

soluble polyether segment of at least 1500 molecular weight, and wherein the sum of the carbon atoms in said isocyanate-containing reactants, said hydroxyl compound and said amino compound is at least 20 and the average molecular weight of the components of the composition is about 10,000-200,000.

19. An aqueous composition as in claim 16 also containing a substance selected from a water insoluble polymeric material, a topical pharmaceutical, and a pesticidal or herbicidal toxicant.

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Search Results - Record(s) 1 through 10 of 21 returned.

☐ 1. Document ID: US 20020158356 A1

L12: Entry 1 of 21 File: PGPB Oct 31, 2002

PGPUB-DOCUMENT-NUMBER: 20020158356
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20020158356 A1

TITLE: Process for manufacturing microcapsules by interfacial polycondensation with polyoxyalkyleneamine and acid chlorides

PUBLICATION-DATE: October 31, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Argillier, Jean-Francois	Saint Cloud		FR	
Soto-Portas, Maria-Lidice	Lyon		FR	
Zydowicz, Nathalie	Saint Priest		FR	
Mechin, Francoise	Lyon		FR	
Chomard, Angele	Paris		FR	

US-CL-CURRENT: 264/4.1

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw Desc | Image

☐ 2. Document ID: US 20020045057 A1

L12: Entry 2 of 21 File: PGPB Apr 18, 2002

PGPUB-DOCUMENT-NUMBER: 20020045057
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20020045057 A1

TITLE: Stenoprophiluric matrices, and methods of making and using the same

PUBLICATION-DATE: April 18, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Guritza, Dennis A.	Chagrin Falls	OH	US	

US-CL-CURRENT: 428/540; 427/2.1, 428/541, 428/543, 435/243, 435/41, 523/122, 523/124, 523/177, 523/442, 523/458

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw Desc | Image

☐ 3. Document ID: US 20020040065 A1

L12: Entry 3 of 21 File: PGPB Apr 4, 2002

PGPUB-DOCUMENT-NUMBER: 20020040065
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20020040065 A1

TITLE: Novel emulsions

PUBLICATION-DATE: April 4, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Scher, Herbert Benson	Morago	CA	US	
Mulqueen, Patrick Joseph	Oxfordshire		GB	
Green, Nicholas David	Berkshire		GB	
Piper, Catherine Julia	Berkshire		GB	

US-CL-CURRENT: 516/98

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw. Desc | Image

☐ 4. Document ID: US 6555228 B2

L12: Entry 4 of 21 File: USPT Apr 29, 2003

US-PAT-NO: 6555228
DOCUMENT-IDENTIFIER: US 6555228 B2

TITLE: Bio-supportive medium, and methods of making and using the same

DATE-ISSUED: April 29, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Guritza; Dennis A.	Chagrin Falls	OH	44023	

US-CL-CURRENT: 428/414; 106/14.05, 424/78.09, 428/411.1, 428/413, 428/423.1, 428/447, 428/457, 428/480, 428/523, 428/537.1, 523/122

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw. Desc | Image

☐ 5. Document ID: US 5932200 A

L12: Entry 5 of 21 File: USPT Aug 3, 1999

US-PAT-NO: 5932200
DOCUMENT-IDENTIFIER: US 5932200 A

TITLE: Polyether polyurethane polymers, gels, solutions and uses thereof

DATE-ISSUED: August 3, 1999

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Reich; Murray H.	Princeton	NJ		
Nelson; Ken	Lambertville	NJ		
Kuzma; Jirina	Princeton	NJ		

US-CL-CURRENT: 424/65; 424/400, 424/401, 424/409, 424/486, 524/379, 524/590, 524/591

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw. Desc | Image

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☑ 6. Document ID: US 5851261 A

L12: Entry 6 of 21 File: USPT Dec 22, 1998

US-PAT-NO: 5851261
DOCUMENT-IDENTIFIER: US 5851261 A

TITLE: Process for the production of polyurea encapsulated fertilizer particles and the encapsulated fertilizer particles produced by this process

DATE-ISSUED: December 22, 1998

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Markusch; Peter H.	McMurray	PA		
Cline; Robert L.	Paden City	WV		

US-CL-CURRENT: 71/64.07; 71/64.11

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw. Desc | Image

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☐ 7. Document ID: US 5728762 A

L12: Entry 7 of 21 File: USPT Mar 17, 1998

US-PAT-NO: 5728762
DOCUMENT-IDENTIFIER: US 5728762 A

TITLE: Polyether polyurethane polymers, gels, solutions and uses thereof

DATE-ISSUED: March 17, 1998

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Reich; Murray H.	Princeton	NJ		
Nelson; Ken	Lambertville	NJ		
Kuzma; Jirina	Princeton	NJ		

US-CL-CURRENT: 524/379; 424/409, 424/423, 424/425, 424/486, 424/DIG.13, 428/423.1, 524/590, 524/591

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
Draw. Desc | Image

☐ 8. Document ID: US 5698002 A

L12: Entry 8 of 21 File: USPT Dec 16, 1997

US-PAT-NO: 5698002
DOCUMENT-IDENTIFIER: US 5698002 A

TITLE: Controlled release fertilizers utilizing an epoxy polymer primer coat and methods of production

DATE-ISSUED: December 16, 1997

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Hudson; Alice P.	Jupiter	FL		

US-CL-CURRENT: 71/28; 71/64.02, 71/64.07, 71/64.11, 71/64.13

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
Draw. Desc | Image

☐ 9. Document ID: US 5563233 A

L12: Entry 9 of 21 File: USPT Oct 8, 1996

US-PAT-NO: 5563233
DOCUMENT-IDENTIFIER: US 5563233 A

TITLE: Polyether polyurethane polymers and gels having improved absorption and slip properties

DATE-ISSUED: October 8, 1996

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Reich; Murray H.	Princeton	NJ		
Nelson; Ken	Lambertville	NJ		
Kuzma; Jirina	Princeton	NJ		

US-CL-CURRENT: 528/76

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
Draw. Desc | Image

☐ 10. Document ID: US 5455286 A

L12: Entry 10 of 21 File: USPT Oct 3, 1995

US-PAT-NO: 5455286
DOCUMENT-IDENTIFIER: US 5455286 A

TITLE: Bioactive composition

DATE-ISSUED: October 3, 1995

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Amidon; Gordon L.	Ann Arbor	MI	48103	
Chandrasekharan; Ramachandran	Ypsillenti	MI	48197	
Goldberg; Arthur H.	Montclair	NJ	07042	

US-CL-CURRENT: 523/122; 424/403, 424/405, 424/407, 424/409, 424/418, 424/465, 424/474, 424/477, 424/478, 424/480, 427/2.31, 427/336, 427/340, 427/341, 427/4, 514/944

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw Desc | Image

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☐ 11. Document ID: US 5221698 A

L12: Entry 11 of 21 File: USPT Jun 22, 1993

US-PAT-NO: 5221698
DOCUMENT-IDENTIFIER: US 5221698 A

TITLE: Bioactive composition

DATE-ISSUED: June 22, 1993

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Amidon; Gordon L.	Ann Arbor	MI		
Chandrasekharan; Ramachandran	Ypsilanti	MI		
Goldberg; Arthur H.	Montclair	NJ		

US-CL-CURRENT: 523/122; 424/403, 424/405, 424/407, 427/336, 427/340, 427/341, 427/4, 514/944

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw. Desc | Image

☐ 12. Document ID: US 5204208 A

L12: Entry 12 of 21 File: USPT Apr 20, 1993

US-PAT-NO: 5204208
DOCUMENT-IDENTIFIER: US 5204208 A

TITLE: Processes for custom color encapsulated toner compositions

DATE-ISSUED: April 20, 1993

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Paine; Anthony J.	Mississauga			CA
Martin; Trevor I.	Burlington			CA
Martins; Lurdes M.	Mississauga			CA
Moffat; Karen A.	Brantford			CA
Mychajlowskij; Walter	Georgetown			CA

US-CL-CURRENT: 430/137.12; 430/107.1, 430/110.2, 430/138

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw. Desc | Image

☐ 13. Document ID: US 5204184 A

L12: Entry 13 of 21 File: USPT Apr 20, 1993

US-PAT-NO: 5204184
DOCUMENT-IDENTIFIER: US 5204184 A

TITLE: Microencapsulation using tertiary aliphatic isocyanate capsule wall material

DATE-ISSUED: April 20, 1993

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Shields; Richard L.	Dayton	OH		
Seitz; Michael	Miamisburg	OH		

US-CL-CURRENT: 428/402.21; 264/4.7, 503/213

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw Desc | Image

☐ 14. Document ID: US 5189205 A

L12: Entry 14 of 21 File: USPT Feb 23, 1993

US-PAT-NO: 5189205
DOCUMENT-IDENTIFIER: US 5189205 A

TITLE: Process for preparing isocyanates

DATE-ISSUED: February 23, 1993

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
McGhee; William D.	St. Louis	MO		
Waldman; Thomas E.	Chesterfield	MO		

US-CL-CURRENT: 560/345; 560/338, 562/423, 562/507, 562/550, 562/555

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw Desc | Image

☐ 15. Document ID: US 5139915 A

L12: Entry 15 of 21 File: USPT Aug 18, 1992

US-PAT-NO: 5139915
DOCUMENT-IDENTIFIER: US 5139915 A

TITLE: Encapsulated toners and processes thereof

DATE-ISSUED: August 18, 1992

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Moffat; Karen A.	Brantford			CA
Mychajlowskij; Walter	Georgetown			CA
Paine; Anthony J.	Mississauga			CA
Hsieh; Bing R.	Webster	NY		

US-CL-CURRENT: 430/110.2; 430/124, 430/138

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
Draw. Desc | Image

☐ 16. Document ID: US 5037716 A

L12: Entry 16 of 21 File: USPT Aug 6, 1991

US-PAT-NO: 5037716
DOCUMENT-IDENTIFIER: US 5037716 A

TITLE: Encapsulated toners and processes thereof

DATE-ISSUED: August 6, 1991

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Moffat; Karen A.	Brantford			CA

US-CL-CURRENT: 430/110.2; 430/108.8, 430/111.4, 430/137.12, 430/138

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
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☐ 17. Document ID: US 4767552 A

L12: Entry 17 of 21 File: USPT Aug 30, 1988

US-PAT-NO: 4767552
DOCUMENT-IDENTIFIER: US 4767552 A

TITLE: Urazole compositions useful as additives for functional fluids

DATE-ISSUED: August 30, 1988

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Sowerby; Roger L.	Mentor	OH		

US-CL-CURRENT: 508/279; 44/317, 44/343

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
Draw. Desc | Image

☐ 18. Document ID: US 4426492 A

L12: Entry 18 of 21 File: USPT Jan 17, 1984

US-PAT-NO: 4426492
DOCUMENT-IDENTIFIER: US 4426492 A

TITLE: Disposable, hydrogel soft contact lenses

DATE-ISSUED: January 17, 1984

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Steckler; Robert	Mission Viejo	CA		

US-CL-CURRENT: 525/61; 523/106, 525/58, 525/937

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw. Desc | Image

☐ 19. Document ID: US 4171282 A

L12: Entry 19 of 21 File: USPT Oct 16, 1979

US-PAT-NO: 4171282
DOCUMENT-IDENTIFIER: US 4171282 A

TITLE: Fluorinated nonionic surfactants

DATE-ISSUED: October 16, 1979

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Mueller; Karl F.	New York	NY		

US-CL-CURRENT: 516/69; 252/8.05, 252/8.57, 510/479, 510/480, 510/489, 516/55, 516/74, 560/153, 560/154

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw. Desc | Image

☐ 20. Document ID: US 4079028 A

L12: Entry 20 of 21 File: USPT Mar 14, 1978

US-PAT-NO: 4079028
DOCUMENT-IDENTIFIER: US 4079028 A
**** See image for Certificate of Correction ****
**** See image for Reexamination Certificate ****

TITLE: Polyurethane thickeners in latex compositions

DATE-ISSUED: March 14, 1978

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Emmons; William D.	Huntingdon Valley	PA		
Stevens; Travis E.	Ambler	PA		

US-CL-CURRENT: 524/507; 524/804, 528/67, 528/68, 528/69, 528/77, 528/85, 8/552

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw Desc | Image

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Search Results - Record(s) 21 through 21 of 21 returned.

☑ 21. Document ID: EP 375624 A CA 2006114 C AU 8947171 A CA 2006114 A DK 8906569 A HU 52685 T BR 8906695 A JP 02221204 A PT 92673 A CN 1043601 A US 5035738 A ZA 8909864 A NZ 231966 A IL 92831 A HU 207640 B EP 375624 B1 DE 68921317 E ES 2070927 T3 RU 2093505 C1 JP 2828291 B2

L12: Entry 21 of 21 File: DWPI Jun 27, 1990

DERWENT-ACC-NO: 1990-195703
DERWENT-WEEK: 200112

TITLE: New pesticide salts of low volatility - formed with specific amine, e.g. aminopropyl morpholine Jeffamine D-230, methyl di:ethanol amine or this (hydroxymethyl)aminomethane - e.g. aminopropyl-morpholine, amino-isopropyl-di: or tri:-isopropoxy-amine, methyl-di:ethanolamine, tris-(hydroxymethyl)-aminomethane

INVENTOR: BURNS, J L; WILSON, R H

PRIORITY-DATA: 1988US-0289165 (December 23, 1988), 1988US-0298165 (December 23, 1988)

PATENT-FAMILY:

PUB-NO	PUB-DATE	LANGUAGE	PAGES	MAIN-IPC
EP 375624 A	June 27, 1990		000	
CA 2006114 C	February 13, 2001	E	000	C07C059/70
AU 8947171 A	June 28, 1990		000	
CA 2006114 A	June 23, 1990		000	
DK 8906569 A	June 24, 1990		000	
HU 52685 T	August 28, 1990		000	
BR 8906695 A	September 11, 1990		000	
JP 02221204 A	September 4, 1990		000	
PT 92673 A	June 29, 1990		000	
CN 1043601 A	July 11, 1990		000	
US 5035738 A	July 30, 1991		000	
ZA 8909864 A	August 28, 1991		000	
NZ 231966 A	November 25, 1992		000	C07C215/12
IL 92831 A	December 30, 1992		000	C07C059/70
HU 207640 B	May 28, 1993		000	A01N025/22
EP 375624 B1	February 22, 1995	E	021	A01N025/18
DE 68921317 E	March 30, 1995		000	A01N025/18
ES 2070927 T3	June 16, 1995		000	A01N025/18
RU 2093505 C1	October 20, 1997		005	C07C065/21
JP 2828291 B2	November 25, 1998		010	A01N037/40

INT-CL (IPC): A01N 25/18; A01N 25/22; A01N 33/02; A01N 33/04; A01N 33/08; A01N 33/10; A01N 37/00; A01N 37/10; A01N 37/40 ; A01N 39/00; A01N 39/04; A01N 43/84; A01N 57/10; A01N 57/18; A01N 57/20; C07C 51/41; C07C 53/134; C07C 59/70; C07C 65/21; C07C 215/10; C07C 215/12; C07C 215/46; C07C 217/08; C07C 217/42; C07D 295/04; C07D

L12: Entry 6 of 21 File: USPT Dec 22, 1998

DOCUMENT-IDENTIFIER: US 5851261 A
TITLE: Process for the production of polyurea encapsulated fertilizer particles and the encapsulated fertilizer particles produced by this process

Brief Summary Text (4):
In order to be effective in promoting plant growth, fertilizers must contain some amount of water soluble plant nutrients. These are typically in the form of water soluble compounds of nitrogen, phosphorus and potassium, alone or in combination, and often in conjunction with other elements such as, for example, calcium, boron, magnesium, zinc, chlorine, etc. Such particular fertilizers can be made of a single component, e.g., urea, ammonium nitrate, potassium chloride, etc., or of multiple components often mixed with inert water soluble or water insoluble materials as in common fertilizers designated as 6-6-6, 4-6-4, 10-10-10, 20-20-5, 14-16-0, 5-20-20, and the like. In addition, specialized fertilizers may contain optional additives such as herbicides, insecticides, trace elements, iron salts, sulfur, etc. The improvements of the present invention can be applied to any of these fertilizers.

Brief Summary Text (48):
Among the suitable amine terminated polyethers are included, for example, those containing primary or secondary (preferably primary) aromatically or aliphatically (preferably aliphatically) bound amino groups, wherein amino end groups can also be attached to the polyether chain through urethane or ester groups. Suitable compounds include, for example, Jeffamine D-400 and Jeffamine D-230, which are commercially available from Huntsman Chemical Corporation.

Detailed Description Text (5):
An amine solution was prepare by diluting 1.45 g of an amine terminated 400 molecular weight polypropylene-oxide polyether (Jeffamine D-400, commercially available from Huntsman), and 13.05 g. of n-hexane (the carrier solvent). This amine solution was applied onto the fertilizer granules by using vacuum to pull the solution into the flask by means of the tubing/stopcock device.

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L12: Entry 21 of 21 File: DWPI Jun 27, 1990

DERWENT-ACC-NO: 1990-195703
DERWENT-WEEK: 200112

TITLE: New pesticide salts of low volatility - formed with specific amine, e.g. aminopropyl morpholine Jeffamine D-230, methyl di:ethanol amine or this (hydroxymethyl)aminomethane - e.g. aminopropyl-morpholine, amino-isopropyl-di: or tri:-isopropoxy-amine, methyl-di:ethanolamine, tris-(hydroxymethyl)-aminomethane

Basic Abstract Text (1):
The amine salt of a pesticidally active cpd. is claimed, where amine is selected from (a) aminopropylmorpholine of formula (I) (b) Jeffamine D-230 of formula H2N-CH(CH3)-CH2-(O-CH2-CH(CH3)nNH2 (II) (n = 2 or 3), (c) methyldiethanolamine (MDEA) of formula CH3-N(CH2CH2OH)2 (III) (d) 2-amino-2-ethyl-1,3-propanediol (AEPD) of formula (IV) (e) tris(hydroxymethyl)aminomethane of formula NH2C(CH2OH)3 (V) and (+) 2,4,6-tris(dimethylaminomethyl) phenol (Actiron NX-3) of formula (II) and NaOH. The pesticidally active cpd. may be e.g. dicamba (3,6-dichloro-2-methoxybenzoic acid) or 2,4-D(2,4-dichlorophenoxyacetic acid).

Basic Abstract Text (2):
ADVANTAGE - The pesticidally active cpds., e.g. herbicidally, insecticidally and fungicidally active cpds. as the amine salts have reduced volatility as compared with the free-acid form and other salt forms without adversely affecting the pesticidal activity.

Equivalent Abstract Text (1):
The amine salt of a pesticidally active compound selected from the group consisting of dicamba, 2,4-D, satls thereof, and mixtures thereof, wherein the amine is selected from the group consisting of a) aminopropylmorpholine (APM) as shown by the formula (I) b) Jeffamine D-230 as shown by the formula (II) wherein n is 2 or 3; c) Methyldiethanolamine (MDEA) as shown by the formula (III) CH3-N-(CH2-CH2-OH)2 (III), d) 2-amino2-ethyl-1,3-propanediol (AEPD) as shown by the formula (IV), e) tris(hydroxymethyl)aminoethane (Tris Amino) as shown by the formula (V) and f) 2,4,6-tris(dimethylaminomethyl)phenol (Actiron NX-3) and NaOH as shown by the formula (VI).

Equivalent Abstract Text (2):
N-Aminopropylmorpholine (APM) salts of the following herbicides are claimed:- phosphoro-methyl glycine (glyphosphate), 2-methyl-4-chlorophenoxyacetic acid (MCPA), 3,6-dichloro-2-methoxybenzoic acid (III) (dicamba) and 2,4-dichlorophenoxyacetic acid (IV) (2,4-D). Herbicidal compsns. are claimed comprising water (in an amt. of at least sufficient to dissolve the herbicidal cpd.) and pref. contg. APM in amts. at least equal to that required to bring the pH to 8.0; pref. cpds. are (III) and (IV). ADVANTAGE - APM reduces the volatility of herbicides contg. COOH gps.

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Search Results - Record(s) 1 through 1 of 1 returned.

☑ 1. Document ID: US 20030104943 A1

L15: Entry 1 of 1 File: PGPB Jun 5, 2003

PGPUB-DOCUMENT-NUMBER: 20030104943
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20030104943 A1

TITLE: Novel surfactants and formulations

PUBLICATION-DATE: June 5, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Lennon, Patrick J.	Webster	MO	US	
Chen, Xiangyang	Chesterfield	MO	US	
Arhancet, Graciela B.	Creve Coeur	MO	US	
Glaenzer, Jeanette A.	University City	MO	US	
Gillespie, Jane L.	St. Louis	MO	US	
Graham, Jeffrey A.	Wildwood	MO	US	
Becher, David Z.	Point Court	MO	US	
Wright, Daniel R.	St. Louis	MO	US	
Agbaje, Henry E.	St. Louis	MO	US	
Xu, Xiaodong C.	Valley Park	MO	US	
Abraham, William	Wildwood	MO	US	
Brinker, Ronald J.	Ellisville	MO	US	
Pallas, Norman R.	Florissant	MO	US	
Wideman, Al S.	St. Louis	MO	US	
Mahoney, Martin D.	St. Peters	MO	US	
Henke, Susan L.	Webster Groves	MO	US	

US-CL-CURRENT: 504/206

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw. Desc | Image

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L15: Entry 1 of 1 File: PGPB Jun 5, 2003

DOCUMENT-IDENTIFIER: US 20030104943 A1
TITLE: Novel surfactants and formulations

Abstract Paragraph (1):
A herbicidal composition is provided comprising an aqueous solution of N-phosphonomethylglycine, predominantly in the form of the potassium salt thereof, at a concentration of at least 300 g a.e./l of the composition; and a surfactant component in solution or stable suspension, emulsion, or dispersion in the water, comprising one or more surfactants in a total amount of about 20 to about 300 g/l of the composition, wherein the composition has a viscosity of less than about 250 centipoise at 0.degree. C. or a Gardner color value less than 10.

Summary of Invention Paragraph (2):
[0001] The present invention relates to aqueous pesticide formulations containing high concentrations of a herbicide, such as the potassium salt of glyphosate, together with surfactants or other adjuvants, including formulations which form anisotropic aggregates (AA) or liquid crystals (LC) on or in the foliage of a plant. More specifically, the present invention relates to glyphosate containing herbicidal formulations containing one or more surfactants that form anisotropic aggregates and/or liquid crystals to facilitate the introduction, uptake and translocation of glyphosate throughout the plant. Methods of killing or controlling unwanted vegetation using such formulations are also described. The invention also relates to novel surfactants and pesticide compositions containing such surfactants.

Summary of Invention Paragraph (4):
[0002] Glyphosate is well known in the art as an effective post-emergent foliar-applied herbicide. In its acid form, glyphosate has a structure represented by formula (1): 1

Summary of Invention Paragraph (6):
[0004] Monobasic, dibasic and tribasic salts of glyphosate can be made. However, it is generally preferred to formulate glyphosate and apply glyphosate to plants in the form of a monobasic salt. The most widely used salt of glyphosate is the mono(isopropylammonium), often abbreviated to IPA, salt. Commercial herbicides of Monsanto Company having the IPA salt of glyphosate as active ingredient include Roundup.RTM., Roundup.RTM. Ultra, Roundup.RTM. Xtra and Rodeo.RTM. herbicides. All of these are aqueous solution concentrate (SL) formulations and are generally diluted in water by the user prior to application to plant foliage. Another glyphosate salt which have been commercially formulated as SL formulations include the trimethylsulfonium, often abbreviated to TMS, salt, used for example in Touchdown.RTM. herbicide of Zeneca (Syngenta).

Summary of Invention Paragraph (9):
[0007] in the ionic form predominantly present in aqueous solution at a pH of about 4. Glyphosate potassium salt has a molecular weight of 207. This salt is disclosed, for example, by Franz in U.S. Pat. No. 4,405,531 cited above, as one of the "alkali metal" salts of glyphosate useful as herbicides, with potassium being specifically disclosed as one of the alkali metals, along with lithium, sodium, cesium and rubidium. Example C discloses the preparation of the monopotassium salt by reacting the specified amounts of glyphosate acid and potassium carbonate in an aqueous medium.

Summary of Invention Paragraph (10):
[0008] Very few herbicides have been commercialized as their potassium salts. The Pesticide Manual, 11th Edition, 1997, lists as potassium salts the auxin type herbicides 2,4-DB ((2,4-dichlorophenoxy)butanoic acid), dicamba (3,6-dichloro-2-methoxybenzoic acid), dichlorprop (2-(2,4-dichlorophenoxy)propanoic acid), MCPA ((4-chloro-2-methylphenoxy)- acetic acid), and picloram (4-amino-3,5,6-trichloro-2-pyridinecarboxylic acid), the active ingredient of certain herbicide products sold by Dow Agrosciences under the trademark Tordon.

Summary of Invention Paragraph (12):
[0010] A major advantage of the IPA salt over many other salts of glyphosate has been the good compatibility in aqueous solution concentrate formulations of that salt with a wide range of surfactants. As used herein, the term "surfactant" is intended to include a wide range of adjuvants that can be added to herbicidal glyphosate compositions to enhance the herbicidal efficacy thereof, as compared to the activity of the glyphosate salt in the absence of such adjuvant, stability, formulability or other beneficial solution property, irrespective of whether such adjuvant meets a more traditional definition of "surfactant."

Summary of Invention Paragraph (13):
[0011] Glyphosate salts generally require the presence of a suitable surfactant for best herbicidal performance. The surfactant can be provided in the concentrate formulation, or it can be added by the end user to the diluted spray composition. The choice of surfactant has a major bearing on herbicidal performance. For example, in an extensive study reported in Weed Science, 1977, volume 25, pages 275-287, Wyrill and Burnside found wide variation among surfactants in their ability to enhance the herbicidal efficacy of glyphosate, applied as the IPA salt.

Summary of Invention Paragraph (14):
[0012] Beyond some broad generalizations, the relative ability of different surfactants to enhance the herbicidal effectiveness of glyphosate is highly unpredictable.

Summary of Invention Paragraph (15):
[0013] Surfactants tending to give the most useful enhancement of glyphosate herbicidal effectiveness are generally but not exclusively cationic surfactants, including surfactants which form cations in aqueous solution or dispersion at pH levels of around 4-5 characteristic of SL formulations of monobasic salts of glyphosate. Examples are long-chain (typically C.sub.12 to C1.sub.18) tertiary alkylamine surfactants and quaternary alkylammonium surfactants. An especially common tertiary alkylamine surfactant used in aqueous solution concentrate formulations of glyphosate IPA salt has been the very hydrophilic surfactant polyoxyethylene (15) tallowamine, i.e., tallowamine having in total about 15 moles of ethylene oxide in two polymerized ethylene oxide chains attached to the amine group as shown in formula (3): 3

Summary of Invention Paragraph (18):
[0016] A class of alkoxylated alkylamines is disclosed in WO 00/59302 for use in herbicidal spray compositions. Potassium glyphosate solutions including various Jeffamine.TM. EO/PO propylamines or propyldiamines are described therein.

Summary of Invention Paragraph (25):
[0022] Nonionic surfactants are generally reported to be less effective in enhancing herbicidal activity than cationic or amphoteric surfactants when used rBN as the sole surfactant component of SL formulations of glyphosate IPA salt; exceptions appear to include certain alkyl polyglucosides, as disclosed for example in Australian Patent No. 627503, and polyoxyethylene (10-100) C1622 alkylethers, as disclosed in PCT Publication No. WO 98/17109. Anionic surfactants, except in combination with cationic surfactants as disclosed in U.S. Pat. No. 5,389,598 and U.S. Pat. No. 5,703,015, are generally of little interest in SL formulations of glyphosate IPA salt. The '015 patent discloses a surfactant blend of a dialkoxylated alkylamine and an anionic eye irritancy reducing compound. The surfactant blend is disclosed as being suitable for preparation of aqueous solution concentrate formulations of various glyphosate salts, the potassium salt being included in the

list of salts mentioned. Concentrates of the '015 patent contain from about 5 to about 50%, preferably about 35% to about 45% glyphosate a.i. and from about 5 to about 25% surfactant. Further, PCT Publication No. WO 00/08927 discloses the use of certain polyalkoxylated phosphate esters in combination with certain polyalkoxylated amidoamines in glyphosate containing formulations. Potassium is identified as one of several salts of glyphosate noted as being "suitable."

Summary of Invention Paragraph (27):
[0024] It is likely that serious consideration of glyphosate potassium salt as a herbicidal active ingredient has been inhibited by the relative difficulty in formulating this salt as a highly concentrated SL product together with preferred surfactant types. For example, a widely used surfactant in glyphosate IPA salt compositions, namely polyoxyethylene (15) tallowamine of formula (3) above, is highly incompatible in aqueous solution with glyphosate potassium salt. Further, PCT Publication No. WO 00/15037 notes the low compatibility of alkoxylated alkylamine surfactants in general with high-strength glyphosate concentrates. As disclosed therein, in order to "build in" an effective level of surfactant, an IL5 alkylpolyglycoside surfactant is required in combination with an alkoxylated alkylamine surfactant to obtain high-strength concentrates containing the potassium salt of glyphosate.

Summary of Invention Paragraph (28):
[0025] The addition of such alkylpolyglycosides resulted in higher viscosity formulations (as compared to formulations without alkylpolyglycosides). Such an increase in the viscosity of these high-strength formulations is undesirable for various reasons. In addition to being more difficult to conveniently pour from the container or to wash residues therefrom, the deleterious effects resulting from higher viscosity formulations is more dramatically observed with respect to pumping requirements. Increasing volumes of liquid aqueous glyphosate products are being purchased by end-users in large refillable containers sometimes known as shuttles, which typically have an integral pump or connector for an external pump to permit transfer of liquid. Liquid aqueous glyphosate products are also shipped in bulk, in large tanks having a capacity of up to about 100,000 liters. The liquid is commonly transferred by pumping to a storage tank at a facility operated by a wholesaler, retailer or cooperative, from which it can be further transferred to shuttles or smaller containers for onward distribution. Because large quantities of glyphosate formulations are purchased and transported in early spring, the low temperature pumping characteristics of such formulations are extremely important.

Summary of Invention Paragraph (29):
[0026] When such alkylpolyglycosides (e.g., Agrimul.TM. APG-2067 and 2-ethyl-hexyl glucoside) are added to a glyphosate concentrate, the formulated product is dark brown in color. It is desirable for a formulated glyphosate product to be lighter in color than the alkylpolyglycoside-containing products as disclosed in WO 00/15037, which have a color value of 14 to 18 as measured by a Gardner colorimeter. When dye is added to a formulated glyphosate product having a Gardner color greater than about 10, the concentrate remains dark brown in color. Concentrates having a Gardner color value of 10 are difficult to dye blue or green as is often desired to distinguish the glyphosate product from other herbicidal products.

Summary of Invention Paragraph (30):
[0027] It would be desirable to provide a storage-stable aqueous concentrate composition (i.e. formulation) of the potassium salt of glyphosate, or other glyphosate salts other than IPA glyphosate, having an agriculturally useful surfactant content, or that is "fully loaded" with surfactant. These formulations exhibit a reduced viscosity such that they may be pumped with standard bulk pumping equipment at 0.degree. C. at rates of at least 7.5 gallons per minute, usually more than 10 gallons per minute and preferably greater than 12.5 gallons per minute. An "agriculturally useful surfactant content" means containing one or more surfactants of such a type or types and in such an amount that a benefit is realized by the user of the composition in terms of herbicidal effectiveness by comparison with an otherwise similar composition containing no surfactant. By "fully loaded" is meant having a sufficient concentration of a suitable surfactant to provide, upon conventional dilution in water and application to foliage, herbicidal effectiveness on one or more important weed species without the need for further surfactant to be

added to the diluted composition.

Summary of Invention Paragraph (33):
[0030] Users of liquid herbicidal products typically meter the dosage by volume rather than by weight, and such products are usually labeled with directions for suitable use rates expressed in volume per unit area, e.g., liters per hectare (Vha) (y or fluid ounces per acre (oziacre). Thus the concentration of herbicidal active ingredient that matters to the user is not percent by weight, but weight per unit volume, e.g., grams per liter (g/l) or pounds per gallon (lb/gal). In the case of glyphosate salts, concentration is often expressed as grams of acid equivalent per liter (g a.e./l).

Summary of Invention Paragraph (34):
[0031] Historically, surfactant-containing glyphosate IPA salt products such as Roundup.RTM. and Roundup.RTM. Ultra herbicides of Monsanto Company have most commonly been formulated at a glyphosate concentration of about 360 g a.e./l. The surfactant-containing glyphosate TMS salt product Touchdown.RTM. of Zeneca has been formulated at a glyphosate concentration of about 330 g a.e./l. Products at lower a.e. concentration, i.e., more dilute, are also sold in some markets, but carry a cost penalty per unit of glyphosate they contain, primarily reflecting packaging, shipping and warehousing costs.

Summary of Invention Paragraph (36):
[0033] At very high glyphosate a.e. concentrations such as these, a significant problem normally occurs. This is the difficulty in pouring and/or pumping of the aqueous concentrate arising from the high viscosity of the concentrate, especially as manifested at low temperatures. It would therefore be highly desirable to have a highly concentrated aqueous solution of glyphosate potassium salt fully loaded with an agriculturally useful surfactant, such formulation preferably being less viscous than glyphosate potassium salt formulations containing alkylpolyglycoside surfactants, such as those disclosed in PCT Publication No. WO 00/15037.

Summary of Invention Paragraph (37):
[0034] There is a continuing need for surfactants which are compatible with a pesticidal formulation, such as an aqueous glyphosate herbicidal concentrate The surfactants of the invention include novel surfactants as well as known surfactants not previously used in pesticidal formulations. Surfactants that are particularly compatible with potassium glyphosate or other glyphosate salts other than IPA glyphosate have been identified for formulating concentrates having improved viscosity, storage stability and loading as compared to known glyphosate concentrates.

Summary of Invention Paragraph (40):
[0036] The present invention provides novel surfactants for formulating pesticide compositions such as aqueous herbicidal concentrates containing glyphosate or a salt or ester thereof. It has also been discovered that certain surfactants previously unknown for use in agriculture enhance herbicidal efficacy while remaining compatible with the glyphosate after prolonged storage.

Summary of Invention Paragraph (41):
[0037] One embodiment of the invention is directed to an aqueous herbicidal concentrate composition comprising glyphosate, predominantly in the form of the potassium salt thereof, in solution in an amount of in excess of 300 grams acid equivalent per liter of the composition, and a surfactant component in solution or stable suspension, emulsion or dispersion, comprising one or more surfactants in a total amount of about 20 to about 300 grams per liter of the composition. The composition either (a) has a viscosity of less than about 250 centipoise at 0.degree. C. at 45/s shear rate, (b) has a Gardner color value of not more than 14 when free of dye or a coloring agent, (c) has a viscosity less than a similarly loaded glyphosate potassium salt composition comprising an alkylpolyglycoside surfactant in combination with an alkoxylated alkylamine surfactant, said alkylpolyglycoside and alkylamine surfactants being present in a weight ratio between about 5:1 and 1:1, (d) controls velvetleaf growth as compared to such a similarly loaded glyphosate potassium salt composition, (e) contains a surfactant component that includes no effective amount of an alkylpolyglycoside and is selected

such that the composition remains substantially homogeneous when stored at 50.degree. C. for about 14 to 28 days, or (f) includes a surfactant component that contains an effective amount of alkylpolyglycoside in combination with at least one additional surfactant that contains no effective amount of an alkoxylated alkylamine.

Summary of Invention Paragraph (43):
[0039] The invention is also directed to formulations which form anisotropic aggregates comprised of a surfactant on the waxy cuticle of the foliage of the plant upon which the formulation is applied. Other herbicidal formulations of the present invention form liquid crystals comprised of the surfactant on the waxy cuticle of the foliage of the plant upon which the formulation is applied. Still other herbicidal formulations of the present invention form liquid crystals comprised of the surfactant on the waxy cuticle of the foliage and inside the plant upon which the formulation is applied. It has been found that the formation of anisotropic aggregates and both epicuticular and intracuticular liquid crystals do not depend on the presence or absence of a second surfactant and significantly enhance the performance of the herbicidal formulations of the present invention.

Detail Description Paragraph (2):
[0042] The pesticidal compositions of the invention include aqueous herbicidal compositions of the potassium salt of glyphosate or another glyphosate salt other than IPA glyphosate and a herbicidal efficacy enhancing amount of one or more surfactants. The compositions of the present invention are storage stable over a wide range of temperatures. Compositions of the present invention also exhibit enhanced viscosity characteristics and significantly lighter color as compared to glyphosate potassium salt compositions containing an alkylpolyglycoside surfactant in combination with an alkoxylated alkylamine surfactant. Such "enhanced viscosity" and "enhanced color" formulations are made possible by the selection of a surfactant system that does not include an alkylpolyglycoside surfactant, yet such formulations are still fully loaded so that, upon dilution in water, no additional surfactant is necessary prior to foliar application to attain commercial level performance. It has also been found that alkylpolyglycoside surfactants in combination with surfactants other than alkoxy alkylamine surfactants can be utilized to provide useful glyphosate potassium salt compositions, although without some of the enhanced viscosity characteristics of the more preferred compositions of the present invention that do not contain alkylpolyglycoside surfactants. Further, by controlling the amount of the alkylpolyglycoside present in the glyphosate potassium salt composition, a sufficient amount of alkoxylated alkylamine, or other surfactant described herein, can be utilized to prepare a suitable formulation. Generally, the ratio of alkypolyglycoside to other surfactant should be between about 1:5 and 5:1, preferably between about 1:5 and 1:1.1, more preferably between about 1:5 and 1:1.2, and most preferably between about 1:5 and 1:1.5. The color of such concentrates is considerably lighter than the concentrates containing greater amounts of alkylpolyglycosides, and is less than 14, preferably less than about 13, 12, 11, 10, 9, 8, 7, 6 or 5.

Detail Description Paragraph (3):
[0043] The herbicidal formulations of the present invention may optionally contain one or more additional surfactants, one or more additional herbicides, and/or other adjuvants or ingredients such as, for example a di-carboxylic acid such as oxalic acid, or a salt or ester thereof. Formulations of the present invention may be prepared on site by the ultimate consumer shortly before application to the foliage of vegetation or weeds to be eliminated or controlled by diluting the aqueous concentrate herbicidal formulations, or by dissolving or dispersing solid particles containing glyphosate. Alternatively, herbicidal formulations of the present invention may be supplied to the ultimate consumer on a "ready to use" basis.

Detail Description Paragraph (6):
[0046] In such embodiment, therefore, the present invention provides an aqueous herbicidal composition comprising:

Detail Description Paragraph (8):
[0048] (2) a surfactant component in solution or stable dispersion in the water, comprising one or more surfactants present in an agriculturally useful amount. It is

preferred that the surfactant component is selected such that the composition has a viscosity of not greater than about 1000 centipoise at 10.degree. C., a cloud point not lower than about 50.degree. C., and preferably exhibits substantially no crystallization of glyphosate or salt thereof when stored at a temperature of about 0.degree. C. for a period of up to about 7 days. More preferably, the composition has a viscosity of not greater than about 500 centipoise at 45 reciprocal seconds at 10.degree. C., with not greater than 250, 225, 200, 175, 150, 125 or 100 centipoise being most preferred. However, higher viscosities may be acceptable in certain circumstance, such as, for example, where low temperature pumping considerations are not important. The surfactant component, as added to the aqueous herbicidal concentrate composition, is in solution or is a stable suspension, emulsion, or dispersion.

Detail Description Paragraph (10):
[0050] As a further aspect of the present invention, a particular class of surfactants has been identified wherein compatibility with glyphosate potassium salt concentrations of greater than 300 g a.e./l to about 600 g a.e./l is unexpectedly high. Accordingly, an embodiment of the invention is a surfactant-containing herbicidal composition as described above wherein the surfactant component predominantly comprises one or more surfactants each having a molecular structure comprising:

Detail Description Paragraph (13):
[0053] The carbohydrate of the hydrophilic moiety is preferably a sugar such as a monosaccharide, disaccharide or polysaccharide. Preferred sugars include glycosides such as alkyl glycosides, alkyl polyglycosides and aminoglycosides. Surfactants containing on average no more than about two carbohydrate groups per surfactant molecule are preferred.

Detail Description Paragraph (20):
[0060] (ii) an alkyl sugar derivative unit, such as a glycoside, polyglycoside, or aminoglycoide group comprising on average no more than about 2 of the alkyl sugar derivative units per surfactant molecule.

Detail Description Paragraph (27):
[0067] (ii) an alkyl sugar derivative unit, such as a glycoside, polyglycoside; or aminoglycoide group comprising on average no more than about 2 of the alkyl sugar derivative units per surfactant molecule.

Detail Description Paragraph (31):
[0071] One embodiment of the invention is a herbicidal concentrate composition as described above wherein the surfactant component predominantly comprises one or more chemically stable surfactants having formula (5):

Detail Description Paragraph (34):
[0073] Another embodiment of the invention is a herbicidal concentrate composition as described above wherein the surfactant component predominantly comprises one or more surfactants having formula (6): 4

Detail Description Paragraph (36):
[0075] It will be appreciated that surfactants conforming to formulas (5) or (6) above include non-restrictively those that can be described as alkyl polyglucosides, alkylaminoglucosides, polyoxyalkylene alkylamines, polyoxalene alkyletheramines, alkyltrimethylammonium salts, alkyldimethylbenzylammonium salts, polyoxyalkylene N-methyl alkylammonium salts, polyoxyalkylene N-methyl alkyletherammonium salts, alkyldimethylamine oxides, polyoxyalkylene alkylamine oxides, polyoxyalkylene alkyletheramine oxides, alkylbetaines, alkylamidopropylamines and the like. In one embodiment of the invention, the average number of oxyalkylene units, such as oxyethylene units, if present, per surfactant molecule is no greater than 22-J where J is as defined above, and the average number of glucose units, if present, per surfactant molecule is no greater than about 2. In another embodiment of the invention, the average number of oxyalkylene units, such as oxyethylene units, if present, per surfactant molecule is no greater than 50-J where J is as defined above, and the average number of glucose units, if present, per surfactant molecule is no greater than about 42.

Detail Description Paragraph (38):
[0077] (A) Surfactants corresponding to formula (5) where R.sup.1 is a C.sub.8-18 aliphatic, saturated or unsaturated, linear or branched hydrocarbyl chain, m, n, p, s, t and w are 0, and v is 1. This group includes several commercial surfactants collectively known in the art or referred to herein as "alkyl polyglucosides" or "APGs". Suitable examples are sold by Henkel as AgrirMul.TM. PG-2069 and Agrimul.TM. PG-2076.

Detail Description Paragraph (80):
[0108] where R.sup.1 is a C.sub.4-18 aliphatic, saturated or unsaturated, linear or branched hydrocarbyl chain, and R.sup.2 is a C.sub.1-4 alkyl or hydrogen and "carbohydrate" is a carbohydrate for example, --CH.sub.2CH(OH)CH(OH)CH(OH)CH(OH)CH.sub.2OH. Further, other derivatives, such as, for example, ethoxylated or nonethoxylated alkyl or amide derivatives of amino sugars (particularly 2-aminoglucose) are of particular interest in glyphosate or other herbicide/pesticide formulations. Di-sugar amines are also of particular interest in this regard.

Detail Description Paragraph (85):
[0111] Novel surfactants have been discovered which are particularly suitable for use in formulating pesticide compositions, such as herbicides. The surfactants have been found to be highly compatible with various water soluble salts of glyphosate, especially potassium, ammonium, and diammonium glyphosate. Cationic surfactants suitable in formulating pesticide formulations include:

Detail Description Paragraph (112):
[0137] Various surfactants not previously used in formulating pesticide compositions have been found to be effective, particularly in formulating aqueous herbicidal concentrates containing potassium or ammonium glyphosate. Cationic surfactants effective in forming pesticide formulations include:

Detail Description Paragraph (167):
[0192] Alternatively, the dialkoxylated amines are preferably formulated in potassium glyphosate concentrates containing at least 320 grams a.e. per liter of potassium glyphosate, that are free of alkyl polyglycosides, or that only contain alkyl polyglycosides having a light color of less than 10, preferably less than 9, 8, 7, 6, or 5 as measured using a Gardner colorimeter. In one embodiment, such concentrates include at least 330, 340, 350, 360, 370, 380, 390, 400, 410, 420, 430, 440, 450, 460, 470, 480, 490, 500, 510, 520, 530, 540, 550, 560, 570 or 580 grams a.e. per liter of potassium glyphosate. It is preferred that such potassium glyphosate concentrates contain from about 400 to about 600 grams a.e. per liter of potassium glyphosate, more preferably from about 450 to about 600, about 500 to about 600, about 540 to about 600 or about 550 to about 600 grams a.e. per liter of potassium glyphosate.

Detail Description Paragraph (194):
[0218] Also provided by the present invention is a herbicidal method comprising diluting with a suitable volume of water a herbicidally effective volume of a composition as provided herein to form an application composition, and applying the application composition to foliage of a plant or plants.

Detail Description Paragraph (213):
[0237] The term "pesticide" includes chemicals and microbial agents used as active ingredients of products for control of crop and lawn pests and diseases, animal ectoparasites, and other pests in public health. The term also includes plant growth regulators, pest repellants, synergists, herbicide safeners (which reduce the phytotoxicity of herbicides to crop plants) and preservatives, the delivery of which to the target may expose dermal and especially ocular tissue to the pesticide. Such exposure can arise by drift of the pesticide from the delivery means to the person performing the application of the pesticide or being present in the vicinity of an application.

Detail Description Paragraph (218):
[0242] The advantages of compositions of the present invention are reduced as

glyphosate concentration is decreased and are only marginal at a glyphosate concentration lower than about 360 g a.e./l, i.e., lower than the concentration found in such commercial glyphosate IPA salt products as Roundup.RTM. herbicide. In preferred compositions of the invention, glyphosate concentration is not lower than 400 g a.e./l or about 420 g a.e./I, in particularly preferred compositions not lower than about 440, 460 or 480 g a.e./l, for example about 480 to about 540 g a.e./l. It is believed that the upper limit of glyphosate concentration in a storage-stable surfactant-containing composition of the invention is in excess of about 650 g a.e./l, this limit being a consequence of the solubility limit of glyphosate potassium salt in water, compounded by further limitation due to the presence of surfactant.

Detail Description Paragraph (219):
[0243] It is expected that the closer to this upper limit of glyphosate concentration, the less the amount of surfactant that can be accommodated. In some instances, this small amount of surfactant is likely to be inadequate to give reliable enhancement of the herbicidal efficacy of the glyphosate to an acceptable degree. However, Win certain special-purpose applications where the composition is to be diluted with a relatively small amount of water, for plant treatment at a volume of, for example, about 10 to about 50 l/ha, the surfactant concentration in a concentrate composition of the invention can usefully be as low as about 20 g/l. Such special-purpose applications include rope-wick, control droplet application and ultra-low-volume aerial spraying. For general-purpose application, typically by spraying following dilution with about 50 to about 1000 l/ha, most commonly about 100 to about 400 l/ha, of water, the surfactant concentration in a concentrate composition of the invention is preferably about 60 to about 300 g/l, and more preferably about 60 to 200 g/l.

Detail Description Paragraph (220):
[0244] The herbicidal formulations of the present invention include at least one surfactant that, in combination with glyphosate or a salt or ester thereof and upon application of the formulation to a plant or an application mixture prepared by dilution of the formulation with water, forms anisotropic aggregates comprising the surfactant on the foliage (epicuticular wax) of the plant. In some formulations of the present invention, a surfactant, in combination with glyphosate or a salt or ester thereof and upon application of the formulation to a plant or an application mixture prepared by dilution of the formulation with water, forms liquid crystals comprising the surfactant on the foliage of the plant (epicuticular wax). In other formulations of the present invention, a surfactant, in combination with glyphosate or a salt or ester thereof and upon application of the formulation to a plant or an application mixture prepared by dilution of the formulation with water forms liquid crystals comprising the surfactant both on the foliage of the plant (epicuticular wax) and with the plant itself (intracuticular liquid crystals). In other formulations of the present invention, a herbicidal formulation comprising an aqueous mixture containing glyphosate or a salt or ester thereof and a surfactant contains liquid crystals comprising the surfactant.

Detail Description Paragraph (222):
[0246] In addition to the glyphosate or salt or ester thereof, the herbicidal formulations of the present invention also comprise at least one surfactant. In one embodiment of the present invention, the nature of the surfactant and the composition of the herbicidal formulation is such that upon application of the formulation to a plant or an application mixture prepared by dilution of the formulation with water, anisotropic aggregates comprising the surfactant are formed on the waxy cuticle (epicuticular) of the plant. These anisotropic aggregates are formed on the foliage of the plant regardless whether a second surfactant is present in the formulation. The anisotropic aggregates may form immediately upon application to the foliage of the plant, or may form as water is evaporated from the formulation present upon the foliage after application. Further, anisotropic aggregates may also form in the concentrate herbicidal formulations.

Detail Description Paragraph (223):
[0247] To determine whether a herbicidal formulation comprising glyphosate or a salt or ester thereof and a surfactant forms anisotropic aggregates on the foliage of a plant comprising the surfactant, the following birefringence testing procedure may

be utilized.

Detail Description Paragraph (226):
[0250] The next stage in the procedure is to conduct the test. For this purpose, samples of the glyphosate herbicidal formulation containing one or more surfactants are diluted, if necessary, to 15% to 20% by weight of the glyphosate acid equivalent. A reference sample is prepared consisting of 41% by weight of glyphosate IPA salt in aqueous solution.

Detail Description Paragraph (246):
[0270] Herbicidal formulations of the present invention that form epicuticular anisotropic aggregates have substantially improved performance over herbicidal formulations currently available. Without being bound to a particular theory, it is believed that the epicuticular anisotropic aggregates may create or enlarge hydrophilic channels through the epicuticular waxy surface of the plant cuticle. These created or enlarged transcuticular channels through the waxy surface may facilitate the mass transfer of glyphosate through the epicuticular wax of the plant cuticle and into the plant more rapidly than in a system without anisotropic aggregates. It is further believed that the majority of the anisotropic aggregates present on the epicuticular surface are present in a form other than a simple micelle, such as a bilayer or multilamellar structure as they tend to form complex structures such as cylindrical, discotic, or ribbon like structures. "Majority" means that more than 50% by weight of the surfactant is present in the form of complex aggregates other than simple micelles. Preferably, more than 75% by weight of the surfactant is present in the form of complex aggregates other than simple micelles. The anisotropic aggregates of the present invention typically have a diameter of at least about 20 nanometers, preferably at least about 30 nanometers.

Detail Description Paragraph (253):
[0276] The herbicidal formulations of the present invention including glyphosate and a surfactant that forms anisotropic aggregates on a waxy plant surface may be prepared as aqueous concentrated formulations comprising at least about 50 g glyphosate a.e./L, more preferably at least about 250 g glyphosate a.e./L, still more preferably at least about 300, 360, 380, 400, 440, 480, 500, 540, or 600 g glyphosate a.e./L. One example of a preferred aqueous concentrate glyphosate formulation contains the isopropylamine or potassium salt of glyphosate at about 360 g glyphosate a.e./L, or about the same level as currently used by Monsanto Corporation in its commercial formulation of Roundup.RTM. herbicide. Another preferred aqueous concentrate glyphosate formulation contains the isopropylamine or potassium salt of glyphosate at about 300 to about 600, preferably at about 400 to about 600, about 440 to about 600, about 440 to about 480, about 480 to about 600, or about 480 to about 540 g glyphosate a.e./L.

Detail Description Paragraph (258):
[0281] Typically, herbicidal compositions of the present invention that are ready to be applied directly to foliage can be made with a glyphosate concentration of from about 1 to about 40 grams acid equivalent per liter, preferably from about 2 to about 18 grams acid equivalent per liter, more preferably from about 4 to about 11 grams acid equivalent per liter. One skilled in the art will recognize that various

Detail Description Paragraph (259):
[0282] Any convenient and herbicidal activity enhancing amount of the surfactant which comprises anisotropic aggregates on the waxy surface of a plant may be used in the glyphosate formulations of the present invention. Preferably, the surfactant is present in the concentrated glyphosate formulations of the present invention in a concentration of from about 25 to about 250 g/L, more preferably from about 50 to about 200 g/L. Although higher concentrations of the surfactant can be incorporated into the glyphosate formulations of the present invention, for economical reasons it is generally more suitable to use the concentration ranges set forth above. Herbicidal formulations of the present invention that are ready to be applied directly to foliage can be made with a surfactant concentration of from about 0.1 g/L to about 10 g/L, preferably from about 1 g/L to about 5 g/L.

Detail Description Paragraph (260):
[0283] In some herbicidal formulations of the present invention, the nature of the

surfactant and the composition of the herbicidal formulation is such that upon application of the formulation to a plant or an application mixture prepared by dilution of the formulation with water, liquid crystals comprising the surfactant are formed on the foliage of the plant (epicuticular liquid crystals). In other words, liquid crystals comprising the surfactant form to create or enlarge hydrophilic channels through the epicuticular wax of the plant cuticle. An important feature of the herbicidal formulations of the present invention is that the surfactant be able to form liquid crystals in the presence of glyphosate on a waxy, porous substrate such as a leaf cuticle to produce transcuticular hydrophilic channels epicuticularly through the waxy cuticle. A distinguishing characteristic of the surfactants which comprise the liquid crystals in the presence of glyphosate is the tendency of the surfactant molecules to align themselves along a common axis in an ordered manner. Typically, liquid crystals have a higher degree of order than isotropic solutions and are much more fluid than solid crystals. Fluidity of liquid crystals may be an important factor in the improved translocation of glyphosate throughout the plant.

Detail Description Paragraph (263):
[0286] The liquid crystals comprising a surfactant in the presence of glyphosate epicuticularly are typically lyotropic liquid crystals; that is the formation of liquid crystals is typically induced by the presence of a solvent, in this case water. The mesophases of the liquid crystals depend not only on the solvent present, but also on temperature. Lyotropic liquid crystals comprising a surfactant in the presence of glyphosate that form transcuticular hydrophilic channels have been observed in hexagonal formation, reversed hexagonal formation, and lamellar and multilamellar formations having at least about 20 to about 30 or more separate, distinct layers. It may be possible to also have lyotropic liquid crystals in a cubical form. Also, both smectic and nematic forms of liquid crystals comprised of a surfactant in the presence of glyphosate have been observed. In the herbicidal formulations of the present invention, liquid crystals form regardless of the presence or absence of a second surfactant.

Detail Description Paragraph (268):
[0291] To determine whether a herbicidal formulation comprising glyphosate or a salt or ester thereof and a surfactant forms liquid crystals comprising the surfactant on the foliage of a plant, the following high resolution polarized microscopy birefringence testing procedure may be utilized. This high resolution birefringence test is capable of distinguishing liquid crystal phase formations and their characteristic microfine textures from other types of anisotropic aggregates or solid crystals precipitated out of solution due to water evaporation. The test procedure is as follows.

Detail Description Paragraph (272):
[0295] After a cuticle has been isolated, it is used for the test to determine whether a specific herbicidal formulation containing glyphosate and a surfactant forms liquid crystals comprising the surfactant on the waxy cuticle. The cuticle is transferred to a glass slide and examined under a microscope (without any polarized light) for cracks and other damage. If cracks or other damage are identified on the surface of the cuticle, it is discarded. Once a suitable cuticle is observed, it is further examined under a microscope (at 7.5.times.magnification) with polarized light to ensure that a dark field is observed. If small areas of crystalline wax are noted on the cuticle surface, these areas are carefully avoided during testing.

Detail Description Paragraph (275):
[0298] Herbicidal formulations of the present invention containing glyphosate or a salt or ester thereof form epicuticular liquid crystals have substantially improved performance over herbicidal formulations currently available, and may be superior to herbicidal formulations which simply form anisotropic aggregates epicuticularly. Without being bound to a particular theory, it appears that the formation of liquid crystals on the epicuticular portion of a plant form or enlarge hydrophilic channels through the waxy cover of foliage. These created or enlarged hydrophilic channels may substantially increase the mass transfer of glyphosate through the waxy cuticle and into the plant.

Detail Description Paragraph (278):

[0301] In some herbicidal formulations of the present invention, the nature of the surfactant and the composition of the herbicidal formulation is such that upon application of the formulation to a plant or an application mixture prepared by dilution of the formulation with water, liquid crystals comprising the surfactant are formed both on the foliage of the plant (epicuticular liquid crystals) and in the foliage of the plant (intracuticular liquid crystals). In other words, liquid crystals comprising the surfactant form to create or enlarge hydrophilic channels through the epicuticular wax of the plant cuticle and also form inside of the plant (intracuticular) to form pathways deep inside of the plant which may significantly enhance translocation of glyphosate throughout the plant pathways. These transcuticular pathways may be responsible for the increase efficacy such formulations provide. An important feature of the herbicidal formulations of the present invention which form both epicuticular and intracuticular liquid crystals is that the surfactant is able to form liquid crystals both on and in the plant.

Detail Description Paragraph (281):
[0304] The liquid crystals comprising a surfactant in the presence of glyphosate epicuticularly and intracuticularly are typically lyotropic liquid crystals; that is the formation of liquid crystals is typically induced by the presence of a solvent, such as water. The mesophases of the liquid crystals depend not only on the solvent, but may also be temperature dependent. Lyotropic liquid crystals comprising a surfactant in the presence of glyphosate epicuticularly and intracuticularly have been observed in cubical formation, hexagonal formation, reversed hexagonal formation, and lamellar and multilamellar formations having at least about 20 to about 30 or more separate layers. Also, both smectic and nematic forms of liquid crystals comprised of a surfactant in the presence of glyphosate have been observed both epicuticularly and intracuticularly. In the herbicidal formulations of the present invention, both epicuticular and intracuticular liquid crystals comprising a surfactant in the presence of glyphosate form regardless of the presence or absence of a second surfactant.

Detail Description Paragraph (285):
[0308] Although the present invention is directed primarily at aqueous concentrate formulations of the potassium salt of glyphosate, such aqueous concentrate formulations can optionally further comprise one or more additional pesticides, such as for example, water-soluble herbicidal active ingredients, including without restriction water-soluble forms of acifluorfen, asulam, benazolin, bentazon, bialaphos, bispyribac, bromacil, bromoxynil, carfentrazone, chloramben, clopyralid, 2,4-D, 2,4-DB, dalapon, dicamba, dichlorprop, diclofop, difenzoquat, diquat, endothall, fenac, fenoxaprop, flamprop, fluazifop, fluoroglycofen, fluroxypyr, fomesafen, fosamine, glufosinate, haloxyfop, imazameth, imazamethabenz, imazamox, imazapic, imazapyr, imazaquin, imazethapyr, ioxynil, MCPA, MCPB, mecoprop, methylarsonic acid, naptalam, nonanoic acid, paraquat, picloram, sulfamic acid, 2,3,6-TBA, TCA and triclopyr.

Detail Description Paragraph (286):
[0309] An embodiment of the invention therefore is an herbicidal aqueous concentrate composition comprising glyphosate predominantly in the form of the potassium salt thereof, and a second anionic herbicide predominantly in the form of a potassium or other agriculturally acceptable salt or acid thereof, the total concentration of the glyphosate and the second anionic herbicide together being about 360 to about 570 g a.e./l, the composition further comprising a surfactant component, selected in accordance with the invention, at a concentration of about 20 to about 300 g/l.

Detail Description Paragraph (287):
[0310] In this embodiment, it is preferred that the weight/weight ratio of glyphosate a.e. to the second anionic herbicide be not less than about 1:1, for example from about 1:1 to about 200:1, preferably between 1:1 to about 30:1. The second anionic herbicide is preferably selected from the group consisting of acifluorfen, bialaphos, carfentrazone, clopyralid, 2,4-D, 2,4-DB, dicamba, dichlorprop, glufosinate, MCPA, MCPB, mecoprop, methylarsonic acid, nonanoic acid, picloram, triclopyr and herbicides of the imidazolinone class, including imazameth, imazamethabenz, imazamox, imazapic, imazapyr, imazaquin and imazethapyr.

Detail Description Paragraph (288):

[0311] Also embraced by the present invention are liquid concentrate formulations having an aqueous phase wherein glyphosate is present predominantly in the form of the potassium salt thereof, and a non-aqueous phase optionally Such formulations illustratively include emulsions (including macro- and microemulsions, water-in-oil, oil-in-water and water-in-oil-in-water types), suspensions and suspoemulsions. The non-aqueous phase can optionally comprise a microencapsulated component, for example a microencapsulated herbicide. In formulations of the invention having a non-aqueous phase, the concentration of glyphosate a.e. in the composition as a whole is nonetheless within the ranges recited herein for aqueous concentrate formulations.

Detail Description Paragraph (289):
[0312] Illustrative water-insoluble herbicides that can be used in such formulations include acetochlor, aclonifen, alachlor, ametryn, amidosulfuron, anilofos, atrazine, azafenidin, azimsulfuron, benfluralin, benfuresate, bensulfuron-methyl, bensulide, benzofenap, bifenox, bromobutide, bromofenoxim, butachlor, butamifos, butralin, butroxydim, butylate, cafenstrole, carbetamide, carfentrazone-ethyl, chlomethoxyfen, chlorbromuron, chloridazon, chlorimuron-ethyl, chlomitrofen, chlorotoluron, chlorpropham, chlorsulfuron, chlorthal-dimethyl, chlorthiamid, cinmethylin, cinosulfuron, clethodim, clodinafop-propargyl, clomazone, clomeprop, cloransulam-methyl, cyanazine, cycloate, cyclosulfamuron, cycloxydim, cyhalofop-butyl, daimuron, desmedipham, desmetryn, dichlobenil, diclofop-methyl, diflufenican, dimefuron, dimepiperate, dimethachlor, dimethametryn, dimethenamid, dinitramine, dinoterb, diphenamid, dithiopyr, diuron, EPTC, esprocarb, ethalfluralin, ethametsulfuron-methyl, ethofumesate, ethoxysulfuron, etobenzanid, fenoxaprop-ethyl, fenuron, flamprop-methyl, flazasulfuron, fluazifop-butyl, fluchloralin, flumetsulam, flumiclorac-pentyl, flumioxazin, fluometuron, fluorochloridone, fluoroglycofen-ethyl, flupoxam, flurenol, fluridone, fluroxypyr-1-methylheptyl, flurtamone, fluthiacet-methyl, fomesafen, halosulfuron, haloxyfop-methyl, hexazinone, imazosulfuron, indanofan, isoproturon, isouron, isoxaben, isoxaflutole, isoxapyrifop, lactofen, lenacil, linuron, mefenacet, metamitron, metazachlor, methabenzthiazuron, methyldymron, metobenzuron, metobromuron, metolachlor, metosulam, metoxuron, metribuzin, metsulfuron, molinate, monolinuron, naproanilide, napropamide, naptalam, neburon, nicosulfuron, norflurazon, orbencarb, oryzalin, oxadiargyl, oxadiazon, oxasulfuron, oxyfluorfen, pebulate, pendimethalin, pentanochlor, pentoxazone, phenmedipham, piperophos, pretilachlor, primisulfuron, prodiamine, prometon, prometryn, propachlor, propanil, propaquizafop, propazine, propham, propisochlor, propyzamide, prosulfocarb, prosulfuron, pyraflufen-ethyl, pyrazolynate, pyrazosulfuron-ethyl, pyrazoxyfen, pyributicarb, pyridate, pyriminobac-methyl, simazine, sirnetryn, sulcotrione, sulfentrazone, sulfometuron, sulfosulfuron, tebutam, tebuthiuron, terbacil, terbumeton, terbuthylazine, terbutryn, thenylchlor, thiazopyr, thifensulfuron, thiobencarb, tiocarbazil, tralkoxydim, triallate, triasulfuron, tribenuron, trietazine, trifluralin, triflusulfuron and vemolate. It is preferred that the weight/weight ratio of glyphosate a.e. to such water-insoluble herbicide be not less than 1:1, for example from about 1:1 to about 200:1, preferably between 1:1 to about 30:1.

Detail Description Paragraph (291):
[0314] A type of excipient ingredient often used in glyphosate formulations is an inorganic salt such as ammonium sulfate, included to enhance herbicidal activity, or consistency of herbicidal activity, of the glyphosate. As the content of inorganic salt in the formulation needed to provide such enhancement is typically relatively high, often greater than the amount of glyphosate present, it will seldom be useful to add such salt to a composition of the invention. The amount of ammonium sulfate, for example, that could be accommodated in a storage-stable aqueous composition containing glyphosate potassium salt at a concentration of at least 360 g a.e./l would be so small as to bring no substantial benefit. An alternative, therefore, is to include a small amount of a synergist such as an anthraquinone compound or a phenyl-substituted olefin compound as disclosed in International Publication Nos. WO 98/33384 and WO 98/33385 respectively.

Detail Description Paragraph (292):
[0315] To determine whether a herbicidal formulation comprising glyphosate or a salt or ester thereof and a surfactant forms liquid crystals comprising a surfactant on the foliage of a plant and in the foliage of a plant, the following procedures are

utilized. First, the surfactant/glyphosate formulation is tested as described above to determine whether liquid crystals form epicuticulariy on the plant foliage. If it is determined that epicuticular liquid crystals do form on the plant foliage, the following testing procedure using high resolution polarized microscopy is utilized to determine whether liquid crystals also form intracuticularly.

Detail Description Paragraph (295):
[0318] Herbicidal formulations of interest containing a surfactant and glyphosate are deposited on the cuticle and on the parafilm. When the onset of liquid crystal formulation is observed under a polarized light at 100.times.magnification as described above, both the cuticle and the parafilm control are wiped away either by hand or by mechanical means with a foam tip at room temperature. Typically, the liquid crystals formed on the parafilm are easily wiped away. Both the parafilm control and the fruit cuticle, after wiping, are left to achieve equilibrium for between about 24 and about 48 hours in a controlled environment (temperature between 20 to about 25.degree. C., humidity 50% to 75%).

Detail Description Paragraph (298):
[0321] Further, the addition of a solubilizer imparts improved viscosity characteristics on concentrated formulations of the present invention. It is preferred that sufficient solubilizer be added to the formulation to produce a formulation having a viscosity of less than 1000 c.p. at 0.degree. C. at 45/s shear rate, even more preferably less than about 500 c.p. at 0.degree. C. at 45/s shear rate, and most preferably less than about 300 c.p. at 0.degree. C. at 45/s shear rate. In a preferred embodiment, the herbicidal formulations of the present invention have a viscosity of from about 100 c.p. at 0.degree. C. at 45/s shear rate to about 500 c.p. at 0.degree. C. at 45/s shear rate. The novel formulations of the present invention require only a small amount of solubilizer to produce these desired viscosities.

Detail Description Paragraph (299):
[0322] Another ingredient that can optionally be added to the glyphosate herbicidal formulations of the present invention to further improve the herbicidal effectiveness and related herbicidal properties is a di-carboxylic acid or salt of a di-carboxylic acid. Suitable di-carboxylic acids that may be added to the herbicidal formulations comprising glyphosate or a salt or ester thereof and a surfactant as described herein include, for example, oxalic acid, malonic acid, succinic acid, glutaric acid, maleic acid, adipic acid, and fumaric acid, and combinations or mixtures thereof, with oxalic acid being preferred. Also, in addition to, or in place of the di-carboxylic acid, salts of the aforementioned di-carboxylic acids may be incorporated into the herbicidal formulations of the present invention to improve herbicidal performance. Suitable salts include, for example, alkali metal salts such as potassium salts, alkanolamine salts and lower alkylamine salts. Preferred salts include potassium oxalate, dipotassium oxalate, sodium oxalate, disodium oxalate, diammonium oxalate, diethanolamine oxalate, dimethylamine oxalate, alkanolamine salts of oxalic acid, and lower alkylamine salts of oxalic acid.

Detail Description Paragraph (300):
[0323] Formulations containing a di-carboxylic acid such as oxalic acid or a di-carboxylic acid salt such as potassium oxalate, typically contain a sufficient amount of di-carboxylic acid/di-carboxylic acid salt to enhance the resulting efficacy of the herbicidal formulation. Typically, the weight ratio of total surfactant to carboxylic acid/carboxylic acid salt may be from about 1:1 to about 50:1, more preferably 5:1 to 40:1 and most preferably from about 5:1 to about 20:1. This ratio of total surfactant to carboxylic acid/carboxylic acid salt significantly enhances the herbicidal performance of the resulting herbicidal formulation.

Detail Description Paragraph (301):
[0324] The di-carboxylic acid or salt thereof which can be added to herbicidal formulations of the present invention to improve efficacy are suitable for use with glyphosate, or salts or esters thereof. Suitable glyphosate salts include those listed above, specifically isopropylamine salt, potassium salt, and trimethylammonium salt.

Detail Description Paragraph (302):

[0325] The present invention also includes a method for killing or controlling weeds or unwanted vegetation comprising the steps of diluting a liquid concentrate in a convenient amount of water to form a tank mix and applying a herbicidally effective amount of the tank mix to the foliage of the weeds or unwanted vegetation. Similarly included in the invention is the method of killing or controlling weeds or unwanted vegetation comprising the steps of diluting a solid particulate concentrate in a convenient amount of water to form a tank mix and applying a herbicidally effective amount of the tank mix to the foliage of the weeds or unwanted vegetation.

Detail Description Paragraph (303):
[0326] In a herbicidal method of using a composition of the invention, the composition is diluted in a suitable volume of water to provide an application solution which is then applied to foliage of a plant or plants at an application rate sufficient to give a desired herbicidal effect. This application rate is usually expressed as amount of glyphosate per unit area treated, e.g., grams acid equivalent per hectare (g a.e./ha). What constitutes a "desired herbicidal effect" is, typically and illustratively, at least 85% control of a plant species as measured by growth reduction or mortality after a period of time during which the glyphosate exerts its full herbicidal or phytotoxic effects in treated plants. Depending on plant species and growing conditions, that period of time can be as short as a week, but normally a period of at least two weeks is needed for glyphosate to exert its full effect.

Detail Description Paragraph (304):
[0327] The selection of application rates that are herbicidally effective for a composition of the invention is within the skill of the ordinary agricultural scientist. Those of skill in the art will likewise recognize that individual plant conditions, weather and growing conditions, as well as the specific active ingredients and their weight ratio in the composition, will influence the degree of herbicidal effectiveness achieved in practicing this invention. With respect to the use of glyphosate compositions, much information is known about appropriate application rates. Over two decades of glyphosate use and published studies relating to such use have provided abundant information from which a weed control practitioner can select glyphosate application rates that are herbicidally effective on particular species at particular growth stages in particular environmental conditions.

Detail Description Paragraph (305):
[0328] Herbicidal compositions of glyphosate salts are used to control a very wide variety of plants worldwide, and it is believed the potassium salt will prove no different from other salts of glyphosate in this regard.

Detail Description Paragraph (311):
[0334] If desired, the user can mix one or more adjuvants with a composition of the invention and the water of dilution when preparing the application composition. Such adjuvants can include additional surfactant and/or an inorganic salt such as ammonium sulfate with the aim of further enhancing herbicidal efficacy. However, under most conditions a herbicidal method of use of the present invention gives acceptable efficacy in the absence of such adjuvants.

Detail Description Paragraph (322):
[0340] Surfactant-containing compositions 2-01 to 2-13 are prepared as described below. Each contains glyphosate potassium salt, and was prepared using the 50% a.e. potassium glyphosate solution from Example A, above. Comparative compositions containing glyphosate potassium salt, an alkylpolyglycoside, and alkoxylated alkylamine surfactants (Compositions 2.01-2.05) were prepared so as to duplicate the compositions set forth for Examples 1, 2, 3, 7,and 15 of PCT Publication No. WO 00/15037, respectively.

Detail Description Paragraph (348):
[0362] It will be noted that the compositions of the invention containing glyphosate potassium salt without alkylpolyglycoside as a component of the surfactant system generally have significantly lower viscosity than similarly loaded glyphosate potassium salt compositions containing APG. The magnitude of this viscosity particular surfactant(s) employed. For example, the preceding description of

specific embodiments of the present invention is not intended to be a complete list of every possible embodiment of the invention. Persons skilled in this field will recognize that modifications can be made to the specific embodiments described here that remain within the scope of the present invention.

Detail Description Paragraph (418):
[0410] An especially preferred herbicide is N-phosphonomethylglycine (glyphosate), a salt, adduct or ester thereof, or a compound which is converted to glyphosate in plant tissues or which otherwise provides glyphosate ion. Glyphosate salts that can be used according to this invention are outlined in U.S. Pat. No. 4,405,531, which is incorporated by reference herein. The glyphosate salts are generally comprised of alkali metals, halogens, organic amines or ammonia, and include, but are not limited to, the following. The mono-, di- and tri-alkali metal salts of potassium, lithium and sodium. Salts of the alkali earth metals calcium, barium, and magnesium. Salts of other metals including copper, manganese, nickel and zinc. The mono-, di- and tri-halide salts of fluorine, chlorine, bromine, and iodine. Monoammonium, alkyl and phenyl ammonium salts, including the mono-, di- and tri-forms, comprising ammonium, methylammonium, ethylammonium, propylammonium, butylammonium and aniline. Alkylamine salts, including the mono-, di- and tri-forms, comprising methylamine, ethylamine, propylamine, butylamine, methylbutylamine, stearylamine and tallowamine. Alkenylamine salts based on ethylene, propylene or butylene. Cyclic organic amine salts including pyridine, methylsulfonium, ethylsulfonium, propyl sulfonium, and butyl sulfonium. Other salts including sulfoxonium, methoxymethylamine and phenoxyethylamine. Preferred salts of glyphosate include potassium (mono-, di- and tri-forms), sodium (mono-, di- and tri-forms), ammonium, trimethylammonium, isopropylamine, monoethanolamine and trimethylsulfonium.

Detail Description Paragraph (419):
[0411] Because the commercially most important herbicidal derivatives of N-phosphonomethylglycine are certain salts thereof, the glyphosate compositions useful in the present invention will be described in more detail with respect to such salts. These salts are well known and include ammonium, IPA, alkali metal (such as the mono-, di-, and tripotassium salts), and trimethylsulfonium salts. Salts of N-phosphonomethylglycine are commercially significant in part because they are water soluble. The salts listed immediately above are highly water soluble, thereby allowing for highly concentrated solutions that can be diluted at the site of use. In accordance with the method of this invention as it pertains to glyphosate herbicide, an aqueous solution containing a herbicidally effective amount of glyphosate and other components in accordance with the invention is applied to foliage of plants. Such an aqueous solution can be obtained by dilution of a concentrated glyphosate salt solution with water, or dissolution or dispersion in water of a dry (i.e., granular, powder, tablet or briquette) glyphosate formulation.

Detail Description Paragraph (420):
[0412] Exogenous chemicals should be applied to plants at a rate sufficient to give the desired biological effect. These application rates are usually expressed as amount of exogenous chemical per unit area treated, e.g. grams per hectare (g/ha). What constitutes a "desired effect" varies according to the standards and practice of those who investigate, develop, market and use a specific class of exogenous chemicals. For example, in the case of a herbicide, the amount applied per unit area to give 85% control of a plant species as measured by growth reduction or mortality is often used to define a commercially effective rate.

Detail Description Paragraph (421):
[0413] Herbicidal effectiveness is one of the biological effects that can be enhanced through this invention. "Herbicidal effectiveness," as used herein, refers to any observable measure of control of plant growth, which can include one or more of the actions of (1) killing, (2) inhibiting growth, reproduction or proliferation, and (3) removing, destroying, or otherwise diminishing the occurrence and activity of plants.

Detail Description Paragraph (422):
[0414] The herbicidal effectiveness data set forth herein report "inhibition" as a percentage following a standard procedure in the art which reflects a visual

assessment of plant mortality and growth reduction by comparison with untreated plants, made by technicians specially trained to make and record such observations. In all cases, a single technician makes all assessments of percent inhibition within any one experiment or trial. Such measurements are relied upon and regularly reported by Monsanto Company in the course of its herbicide business.

Detail Description Paragraph (423):
[0415] The selection of application rates that are biologically effective for a specific exogenous chemical is within the skill of the ordinary agricultural scientist. Those of skill in the art will likewise recognize that individual plant conditions, weather and growing conditions, as well as the specific exogenous chemical and formulation thereof selected, will affect the efficacy achieved in practicing this invention. Useful application rates for exogenous chemicals employed can depend upon all of the above conditions. With respect to the use of the method of this invention for glyphosate herbicide, much information is known about appropriate application rates. Over two decades of glyphosate use and published studies relating to such use have provided abundant information from which a weed control practitioner can select glyphosate application rates that are herbicidally effective on particular species at particular growth stages in particular environmental conditions.

Detail Description Paragraph (424):
[0416] Herbicidal compositions of glyphosate or derivatives thereof are used to control a very wide variety of plants worldwide. Such compositions can be applied to a plant in a herbicidally effective amount, and can effectively control one or more plant species of one or more of the following genera without restriction: Abutilon, Amaranthus, Artemisia, Asclepias, Avena, Axonopus, Buuitioca, Dssie, Breimu3o, CGhenepodium, CirFiuwR, GommolinA, Convolvulus, Cynodon, Cyperus, Digitaria, Echinochloa, Eleusine, Elymus, Equisetum, Erodium, Helianthus, Imperata, lpomoea, Kochia, Lolium, Malva, Oryza, Ottochloa, Panicum, Paspalum, Phalaris, Phragmites, Polygonum, Portulaca, Pteridium, Pueraria, Rubus, Salsola, Setaria, Sida, Sinapis, Sorghum, Triticum, Typha, Ulex, Xanthium, and Zea.

Detail Description Paragraph (482):
[0474] Thus, the method of the present invention, as it pertains to glyphosate herbicide, can be useful on any of the above species.

Detail Description Paragraph (487):
[0479] Many exogenous chemicals (including glyphosate herbicide) must be taken up by living tissues of the plant and translocated within the plant in order to produce the esirea ol0ogical te.g., [erti(I)ial) eMt. Tu, it lo litiipuittlo, that a herbicidal composition not be applied in such a manner as to excessively injure and interrupt the normal functioning of the local tissue of the plant so quickly that translocation is reduced. However, some limited degree of local injury can be insignificant, or even beneficial, in its impact on the biological effectiveness of certain exogenous chemicals.

Detail Description Paragraph (488):
[0480] A large number of compositions of the invention are illustrated in the Examples that follow. Many concentrate compositions of glyphosate have provided sufficient herbicidal effectiveness in greenhouse tests to warrant field testing on a wide variety of weed species under a variety of application conditions.

Detail Description Paragraph (491):
[0483] In the following Examples illustrative of the invention, greenhouse and field tests were conducted to evaluate the relative herbicidal effectiveness of glyphosate compositions. Compositions included for comparative purposes included the following:

Detail Description Paragraph (503):
[0495] The following procedure was used for testing compositions of the Examples to determine herbicidal effectiveness, except where otherwise indicated.

Detail Description Paragraph (509):
[0501] For evaluation of herbicidal effectiveness, all plants in the test were

examined by a single practiced technician, who recorded percent control, a visual measurement of the effectiveness of each treatment by comparison with untreated plants. Control of 0% indicates no effect, and control of 100% indicates that all of the plants are completely dead. The reported % control values represent the average for all replicates of each treatment.

Detail Description Paragraph (514):
[0505] Results for ABUTH and ECHCF: Compositions 734F2H, and 734G9W exhibited similar herbicidal effectiveness to comparative composition 360 on velvetleaf (ABUTH).

Detail Description Paragraph (519):
[0509] Results for ABUTH and ECHCF: All of the compositions exhibited less herbicidal effectiveness than comparative compositions 360 and 553 on ABUTH and ECHCF.

Detail Description Paragraph (532):
[0519] Results for ABUTH and ECHCF: Compositions 743F8D and 743G3H exhibited similar herbicidal effectiveness for ABUTH to comparative composition 360.

Detail Description Paragraph (537):
[0523] Results for ABUTH and ECHCF: Compositions 627D4W and 62713E exhibited similar herbicidal effectiveness overall to comparative composition 754.

Detail Description Paragraph (658):
[0619] Results for ABUTH and ECHCF: Composition 730C7U was the most active formulation in this experiment and exhibited enhanced herbicidal effectiveness to comparative composition 360 across all rates for velvetleaf (ABUTH) and similar herbicidal effectiveness to comparative composition 360 for grass (ECHCF). Composition 730AOA exhibited similar herbicidal effectiveness to comparative composition 360 for grass (ECHCF) but exhibited enhanced herbicidal effectiveness to comparative compositions for velvetleaf (ABUTH) at the high and low rates.

Detail Description Paragraph (667):
[0626] Results for ABUTH and ECHCF: Composition 487B4R exhibited herbicidal effectiveness similar to comparative composition 553; both composition 487B4R and comparative composition 553 were the most active compositions in the experiment on ABUTH.

Detail Description Paragraph (672):
[0630] Results for ABUTH and ECHCF: Composition 730C1 P was the most active composition on velvetleaf (ABUTH) in the experiment; composition 730C9T exhibited superior herbicidal effectiveness to comparative composition 360 and comparative composition 553 at the two lowest rates. Composition 732C9T was the most active composition on barnyardgrass (ECHCF); composition 732C9T exhibited superior herbicidal effectiveness to comparative composition 360.

Detail Description Paragraph (676):
[0633] Results for ABUTH: Comparative composition 553 exhibited the best herbicidal effectiveness in the experiment.

Detail Description Paragraph (696):
[0649] Results for ABUTH and ECHCF: Composition 553 was the most active composition in this experiment for both velvetleaf (ABUTH) and barnyardgrass (ECHCF). Compositions 721C2W and 721D9I demonstrated comparable herbicidal effectiveness to comparative composition 360.

Detail Description Paragraph (716):
[0665] Results for ABUTH and ECHCF: Composition 140C5L exhibited similar herbicidal effectiveness over comparative composition 560 on velvetleaf (ABUTH) and demonstrated higher herbicidal effectiveness over comparative composition 560 on barnyard grass (ECHCF). Composition 129D2D was one of th weakest performers on velvetleaf but was similar to composition 560 on barnyardgrass. Increasing surfactant from 9.9% (composition 127A3K and 127B4S) to 13.2% (compositions 129A8D and 129B7W) did not substantially affect performance.

Detail Description Paragraph (721):
[0669] Results for ABUTH and ECHCF: Composition 360AD provided the highest level herbicidal effectiveness for barnyardgrass control. Compositions 572A7S, 572B3L, 572C2J, 574A3B, 574B6C, 574C1 U and 360 demonstrated less control of velvetleaf than composition 360AD.

Detail Description Paragraph (741):
[0685] Results for ABUTH and ECHCF: Compositions 265 and 769 exhibited similar herbicidal activity to composition 754 on velvetleaf (ABUTH) and barnyardgrass (ECHCF).

Detail Description Paragraph (746):
[0689] Results for ABUTH and ECHCF: Composition 024E0P exhibited enhanced herbicidal effectiveness over all of the comparative compositions on ABUTH. Composition 024D1X exhibited enhanced herbicidal effectiveness over comparative compositions 139 and 554. Compositions 015A6D, 024A5Q and 024B2L demonstrated enhanced herbicidal effectiveness over comparative compositions 139 and 554.

Detail Description Paragraph (751):
[0693] Results for ABUTH and ECHCF: All compositions exhibited enhanced herbicidal effectiveness over compositions 139 and 554.

Detail Description Table CWU (4):
4TABLE 4 Surfactants used in Example C Trade name and Surfactant Chemical Structure supplier A 54 104-75-6 (Aldrich) B 55 Pfaltz & Bauer (www.pfaltzandbauer.com) C 56 not commercially available (prepared in accordance with Example D, above D 57 not commercially available (prepared by the ethoxylation of N- methyloctadecylamine) E 58 not commercially available (prepared by the ethoxylation of N-methyloctadecylamine F 59 102-83-0 (Aldrich) G 60 CAS 62478-76-6 not commercially available) H 61 CAS 64184-58-3 (not commercially available) I 62 CAS 123714-89-9 (not commercially available) J 63 PA-1214 (Tomah) K 64 PA 10 (Tomah) L 65 PA-12EH (Tomah) M 66 E-17-5 (Tomah) N 67 Surfonic AGM - 550 (Huntsman Petrochemical Corp.) O 68 DA-1214 (Tomah) P 69 DA-1618 (Tomah) Q 70 DA-18 (Tomah) R 71 DA-14 (Tomah) S 72 DA-17 (Tomah) T 73 B1910-5 (Witco) U 74 B1910-6 (Witco) V 75 B1910-9 (Witco) W 76 Mackine 101 X 77 Fluorad FC-754 Y 78 Chemoxide L70 Z C.sub.11C.sub.10+C.sub.9+--O-(glucoside) Agrimul APG 2069 AA 79 23323-37-7 (Aldrich) BB 80 4182-44-9 (Acros) CC 81 Genamin 3119(Clariant) CAS 85632-63-9 DD 82 Jeffamine EDR-148 EE 83 Custom B-1965-F (Witco) FF 84 6637025 GG 85 HH 86 6801342 II 87 6801343 JJ 88 NBP6476266 KK 89 208540-68-5 LL 90 6801357 MM 91 6801359 NN 92 Witco Exp-5388-48 (MON 59124) OO 93 S. Auinbauh ck CAS PP 94 Witco custom B- 1965-F QQ 95 6747747 RR 96 6788433 SS 97 6788438 TT 98 6916805 UU 99 6788445 VV 100 Clariant WW 101 6788437 XX 102 6788449 YY 103 6788440 ZZ 104 6788462 AAA 105 6788468 BBB 106 6788476 CCC 107 6788465 DDD 108 6916412 EEE 109 6747783 FFF 110 6788460 GGG C.sub.12H.sub.25--(OCH.sub.2CH.sub.2).sub.4NHCH.sub.3 6566722 HHH C.sub.12H.sub.25--(OCH.sub.2CH.sub.2).sub.4N(- CH.sub.3).sub.2 6747786 III C.sub.16H.sub.33--(EO).sub.10N- (CH.sub.3).sub.2 6866748 JJJ (tallow)-(PO).sub.2(EO).sub.9- N(CH.sub.3).sub.2 6866733 KKK (C.sub.16H.sub.33)--(OCH.sub- .2CH.sub.2).sub.10NH(CH.sub.2).sub.3NH.sub.2 6866729 LLL 111 6866759 MMM 112 6866758 NNN 113 OOO 114 6866730 PPP 115 6866782 QQQ 116 6866787 RRR 117 6801387 SSS 118 6801389 TTT 119 6801384 UUU 120 6801388 VVV 121 The following compounds were not compatible with 31% a.e. potassium glyphosate and 10% suifactant, but were compatible with 31% a.e. diammonium glyphosate and 10% surfactant: WWW 122 XXX 123

Detail Description Table CWU (8):
8 Nonionic Surfactant having the Formula: C.sub.WO--(EO).sub.XH in IPA Glyphosate Formulation: LC intr LC w x Trade Name a epi AA 11 9 Neodol1-9 N N N 12 10 Procol LA-10 N N N 12 12 Procol LA-12 N N N 12 15 Procol LA-15 N N Y 12 23 Brij 35 N Y Y (laureth) 11-15 9 Tergitol 15-S-9 N N N 11-15 12 Tergitol 15-S-12 N N NT 11-15 15 Tergitol 15-S-15 N N NT 12-15 12 NeodoI 15-12 N N Y 16 2 Hetoxol CA-2 N N N 16 7 ST-8302 N N N 16 10 Hetoxol CA-10 N N Y 16 14 ST-8303 N N Y 16 20 Hetoxol CA-20 Y Y Y 16-18 9 Hetoxol CS-9 N N Y 16-18 15 Hetoxol CS-15 N N Y 16-18 20 Hetoxol CS-20 NT Y Y 16-18 25 Hetoxol CS-25 Y Y Y 16-18 27 Plurafac A38 Y Y Y 16-18 30 Hetoxol CS-30 NT Y Y 18 10 Brij 76 N Y Y 18 20 Brij 78 Y Y Y iso18 10 Arosurf 66 E10 N N N iso18

20 Arosurf 66 E20 N Y Y 18 (oleath) 10 Brij 97 N Y Y 18 (oleath) 20 Brij 98 NT Y Y Other Nonionic Surfactants in IPA Glyphosate Formulation: LC intr LC a epi AA Agrimul PG2069 alkyl polyglucoside N N N Surfonic DNP 80 (PEG 8 dinonyl phenol) N N N Surfonic DNP 100 (PEG 10 dinonyl NT NT Y phenol) Surfonic DNP 140 (PEG 15 dinonyl NT NT Y phenol) Surfonic DNP 240 (PEG 24 dinonyl NT NT Y phenol) Cationic Surfactant having the Formula: 143 LC intr LC w x + y Trade Name a epi AA in IPA Glyphosate Formulation: coco (8-16) 2 Ethomeen G/12 N N N coco 5 Ethomeen C/15 N N N coco 10 Ethomeen C/20 N N N coco 15 Ethomeen C/25 N N N tallow 2 Ethomeen T/12 N N N (16-18) tallow 2 Armeen T12 N N N tallow 5 Ethomeen T/15 N N N tallow 10 Ethomeen T/20 N N N tallow 15 Ethomeen T/25 N N N stearyl (18) 50 Trymeen 6617 N Y Y in Potassium Glyphosate Formulation: coco (8-16) 2 Ethomeen C/12 NT N Y coco 5 Ethomeen C/15 N N N tallow 2 Armeen T12 N N Y 16-18) tallow 5 Ethomeen T/15 NT Y Y Cationic Surfactant having the Formula: 144 in IPA Glyphosate Formulation: LC intr LC w Trade Name: a epi AA tallow (16-18) Armeen T N N N Cationic Surfactant having the Formula: 145 LC intr LC w Trade Name: a epi AA in IPA Glyphosate Formulation: 10 NA N N N coco (8-16) Armeen DMCD N N N tallow (16-18) Armeen TMCD N N N tallow Armeen DMTD N N N in Potassium Glyphosate Formulation: coco (8-16) Armeen DMCD N N N tallow (16-18) Armeen DMTD N Y Y Cationic Surfactant having the Formula: 146 in IPA Glyphosate Formulation: LC intr LC w Trade Name: a epi AA coco (8-16) Armeen 2C N N NT tallow (16-18) Armeen 2T N N Y Cationic Surfactant having the Formula: 147 in IPA Glyphosate Formulation: LC intr LC w x + y Trade Name a epi AA stearyl (18) 7 NA N N N 22 Arosurf 66 E20 N Y Y Cationic Surfactant having the Formula: 148 in IPA Glyphosate Formulation: LC intr LC w x Trade Name a epi AA coco (8-16) 5 NA N N N coco 10 NA N N N coco 15 NA N N Y coco 20 NA N N Y tallow 5 NA NT Y Y 16-18) tallow 10 NA NT Y Y tallow 15 NA NT Y Y tallow 20 NA NT Y Y Cationic Surfactant having the Formula: 149 LC intr LC w x TradeName a epi AA in IPA Glyphosate Formulation: 14-15 7 NA N N NT 14-15 13 NA NT Y Y 14-15 18 NA NT Y Y 16-18 7 NA N N NT 16-18 10 NA N N NT 16-18 15 NA NT Y Y 16-18 20 NA NT Y Y in Potassium Glyphosate Formulation: isotridecyl 5 Tomah E-17-5 N N N oxy 14-15 7 NA N N NT 14-15 13 NA NT Y Y 14-15 18 NA NT Y Y 16-18 7 NA NT Y Y 16-18 10 NA NT Y Y 16-18 15 NA NT Y Y Cationic Surfactant having the Formula: 150 LC intr LC w x TradeName a epi AA in IPA Glyphosate Formulation: 14-15 13 NA NT Y Y in Potassium Glyphosate Formulation: 14-15 18 NA NT Y Y 16-18 15 NA NT Y Y Cationic Surfactant having the Formula: 151 LC intr LC w x + y Trade Name a epi AA in IPA Glyphosate Formulation: coco (8-16) 2 Ethoquad C/12 N N NT coco 5 NA N N NT coco 5 Rewoquat CPEM N N NT tallow 2 Ethoquad T/12 N N N 16-18) tallow 5 NA N N NT tallow 10 Ethoquad T/20 N N NT tallow 15 Ethoquad 5/25 N N NT in Potassium Glyphosate Formulation: coco (8-16) 2 Ethoquad C12 NT Y Y coco 5 NA NT Y Y tallow 5 Ethoquad T12 NT Y Y (16-18) Cationic Surfactant having the Formula: 152 in IPA Glyphosate Formulation: LC intr LC w x + y Trade Name a epi AA tallow 5 NA NT Y Y (16-18) tallow 10 NA NT Y Y tallow 30 NA N N N Cationic Surfactant having the Formula: 153 in IPA Glyphosate Formulation: LC intr LC w x Trade Name a epi AA 18 7 NA NT NT Y 18 22 NA NT NT Y Cationic Surfactant having the Formula: 154 LC intr LC w Trade Name a epi AA in IPA Glyphosate Formulation: dodecyl (12) Arquad C-50 N N N tallow (16-18) Arquad T-50 N N NT in Potassium Glyphosate Formulation: dodecyl (12) Arquad C-50 NT Y Y tallow (16-18) Arquad T-50 NT Y Y Cationic Surfactant having the Formula: 155 in IPA Glyphosate Formulation: LC intr LC

Detail Description Table CWU (10):

9 Ref. Trade Name Manufacturer Chemical Description 1816E 1816E15PA (C16-18)O(CH2CH2O)15(CH2)3NH2 AE10 Arosurf 66 E-10 Witco Ethoxylated branched alkyl 10 EO AGN68 DF 68(89) Agnique Silicone defoamer APG67 APG 2067 Alkyl polyglycoside C8-10 alkyl group and 1.7 glucose groups APG69 APG 2069 Alkyl polyglycoside C8-10 alkyl group and 1.6 glucose groups AR41 Arphos HE- Witco C4EO3 phosphoric acid 6641 ARMC Armeen C Mixed C8-16 (coco) alkyl primary amine ARO66 Arosurf 66 Witco PEG-20 isostearyl ether E10 ARQ27 Arquad T--27% solution of tallow 27W trimethylammonium chloride ARQ37 Arquad Cocotrimethylammonium chloride 1237W (37% in water) ARQ50 Arquad C-50 Akzo Coco trimethyl ammonium chloride B1A B-2050-01A Ethoxylated C16-18 linear alcohol 9.4 EO B1B B-2050-01B Alkyloxylated C16-18 linear alcohol 9.4 EO + 2.2 PO B1C B-2050-01C Alkyloxylated C16-18 linear alcohol 9.4 EO + 4.2 PO B1F B-2050-01F Alkyloxylated C16-18 linear alcohol 9.6 EO + 4.4 PO BRI35 Brij 35 Ethoxylated (23 EO) lauryl ether BRI56 Brij 56 Polyoxyethylene (10 EO) cetyl ether BRI58 Brij 58 Polyoxyethylene (20 EO) cetyl ether BRI78 Brij 78 Exthoxylated (20 EO) stearyl ether CETAC Cetyl trimethyl ammonium chloride DUO50 Duoquat T-50 Akzo Alkyl diamine quaternary salt EA175 Tomah EO etheramine ED175 Tomah EO Di-etheramine EMC42

Emcol CC42 Witco Polypropylene glycol-40 diethyl ammonium chloride EMUL Emulgin L Cognis Cetereth 2 propoxylate 9 ethoxylate ETH12 Ethomeen Akzo Ethoxylated cocoamine 2 EO C12 ETH15 Ethomeen Akzo Ethoxylated tallow amine 5 EO T/15 ETH25 Ethomeen Akzo 15 EO tallow ethoxylate quaternary T/25 ammonium chloride EXP0A EXP B 2030-A coco 15 EO benyl quaternary EXP0B EXP B 2030-B tallow 15 EO benyl quaternary EXP0C EXP B 2030-C N,N--C16 dimethyl 14 EO benyl quaternary EXP86 Experimental Propoxylated C16-18 alcohol 10.4 5880-86B PO GEN2 Genamin Clariant Monoethoxylated alkylamine T200NF AV C18NMe(EO)7H 01/37-2 GEN3 Genamin Clariant Monoethoxylated alkylamine T200NF AV C18NMe(EO)15H 01/37-3 GEN4 Genamin Clariant Monoethoxylated alkylamine T200NF AV C18NMe(EO)23H 01/37-4 HET20 Hetoxol CS20 Ethoxylated (20 EO) C16-C18 ether INT00 Intermediate Witco Phosphate ester tridecanol + 4 EO PF 8000 (C13)O(CH2CH2)4(PO(OH2)) L770 Silwet L-77 Witco hepamethyl trisiloxane 7 EO methyl ether LF700 Plurafac BASF Alkoxylated C16-C18 alkyl LF700 M117 MON 59117 Ethoxylated Ether Amine M121 MON 58121 Huntsman (C12-14)O(CHCH3CH2)O--(CHCH3CH2)N Surfonic (EO)x (EO)y x + y = 5 AGM550 M128 MON78128 Formulation of 480 g a.e./l monoethanolamine glyphosate and 120 g/l M121 M368 MON 78368 Formulation of 357 g a.e./l IPA glyphosate with 57 g/l of EMUL, 85 g/l ethoxylated (10 EO) tallowamine and 57 g/l n-octylamine. M619 MON68619 Formulation of 360 g a.e./l IPA glyphosate with 70 g/l ETH25, 46 g/l BRI56 and 23 g/l CETAC M620 MON68620 Formulation of 360 g a.e./l IPA glyphosate with 83 g/l ETH25, 56 g/l BRI56 and 27 g/l CETAC MPE01 MPEAE EO-etheramine MT13 M-T4513-2 Tomah C14-15 dimethylated etheramine 13 EO NEO25 Neo 25-9 Ethoxylated alcohol with C12-15 hydrophobe and 9 EO NO13 Nopar 13 Exxon Normal parrafin OA Fluka Octyl amine PG069 APG-2069 Agrimul APG C9-C11 alkyl ether glucoside S01 Hexadecyl-eincosa(ethylene oxide) dimethyl amine S02 Hexadecyl-deca(ethylene oxide)- 3-amino-propyl-1-amine S03 Hexadecyl/octadecyl(propylene oxide)-nona(ethylene oxide)-dimethylamine S04 Tallow-di(propylene oxide)- nona(ethylene oxide)-dibutylamine S05 Tallow-di(propylene oxide)- nona(ethylene oxide)-3'-amino- propylamine. S06 Tallow-di(propylene oxide)- nona(ethylene oxide)-N-methyl-glucamine S07 Hexadecyl-penta(propylene oxide)-eicosa(ethylene oxide)- dimethylamine S08 Tridecyl-hexa(ethylene oxide)- tri(propylene oxide)-dimethylamine S09 N-methyloctadecylamino glucitol S10 Hexadecyl-eicosa(ethylene oxide) dimethylamine S11 Hexadecyl-eicosa(ethylene oxide) Tris S12 Hexadecyl-eicosa(ethylene oxide) methylamine S13 Hexadecyl-deca(ethylene oxide)- N-methyl-glucamine S14 1-deoxy-1-(octadecylamino)-D- glucitol S15 Tallow-di(propylene oxide)- nona(ethylene oxide)-N-methyl- glucamine S16 N-dodecylglucamine S17 N-methyloctadecylamine glucitol S18 N,N-dimethyloctadecyl glucitol chloro amino quat S19 Ethoxylated cetyl alcohol S20 N-methyldodecylamino glucitol S21 N,N-dimethyldodecyl glucitol chloro amino quat S22 10 EO isotridecyl phosphate ester (60% monoester) S23 n-hexyl glucamine S24 n-dodecyl glucamine S39 Eicosane-1,20-bis(trimethyl ammonium chloride) S40 Dodecane-1,12-bis(trimethyl ammonium chloride) S41 Hexadecane-1,16-bis(trimethylammonium chloride) S42 N,N-octylglucitol 1,3-propane S43 N,N-dodecylglucitol 1,3-propane S44 N,N-hexylglucitol 1,3-propane S45 N,N'-dioctyl-1,3-diaminopropane octa(ethylene oxide) S46 N,N'-didodecyl-1,3-diaminopropane eicosa(ethylene oxide) S47 N,N'-didecyl-1,3-diaminopropane deca(ethylene oxide) S48 N,N'-didecyl-1,3-diaminopropane octadeca(ethylene oxide) S49 N,N'-didodecyl-1,3- diaminopropane deca(ethylene oxide) S50 N,N'-didodecyl-1,3-diaminopropane eicosa(ethylene oxide) S51 Dodecyl-tetra(ethylene oxide) Tris S52 Tris(hydroxymethyl),N- dodecylaminomethane S53 Dodecyl-tetra(ethylene oxide) dimethyl amine S54 Hexadecyl-deca(ethylene oxide) dimethylamine S55 Dodecyl-tetra(ethylene oxide) trimethyl ammonium chloride S56 Hexadecyl-deca(ethylene oxide) trimethyl ammonium chloride S57 Hexadecyl-eicosa(ethylene oxide) trimethyl ammonium chloride S58 Monoethoxylated alkylamine C18NMe(EO)7.5H S59 Monoethoxylated alkylamine C18NMe(EO)11H S60 N-methyldodecylamino glucitol S61 Ethoxylated cetyl alcohol (10 EO) S62 Hexadecyl-deca(ethyleneoxi- de)-

CLAIMS:

24. A formulation of claim 1 or 2 wherein the surfactant comprised by the formulation is not substantially antagonistic to the herbicidal activity of the glyphosate.

25. A formulation of claim 1, 2 or 15 further comprising a second herbicide.

29. A storage-stable herbicidal concentrate which may be diluted with water to provide an aqueous herbicidal application mixture for application to the foliage of a plant, said concentrate comprising glyphosate or a salt or ester thereof in a concentration of at least about 500 g a.e./l glyphosate acid equivalent, and a surfactant component, the nature and concentration of said surfactant component in said concentrate being such that, upon applying said application mixture to the foliage of a plant, anisotropic aggregates comprising said surfactant are formed on said plant foliage.

30. A storage-stable herbicidal concentrate as set forth in claim 29 which is substantially devoid of liquid crystals comprising said surfactant but having a composition such that, upon application to a plant of said concentrate or said application mixture, liquid crystals comprising said surfactant are formed in or on said plant foliage.

31. A storage-stable herbicidal concentrate as set forth in claim 29 wherein the nature and concentration of said surfactant component in said concentrate being such that, upon applying said application mixture to the foliage of a plant, liquid crystals comprising said surfactant are formed on the plant foliage.

32. A storage-stable herbicidal concentrate of claim 29, 30, or 31 wherein the concentrate comprises a salt of glyphosate selected from the group consisting of potassium glyphosate, monoammonium glyphosate, diammonium glyphosate, sodium glyphosate, monoethanolamine glyphosate, n-propylamine glyphosate, ethylamine glyphosate, ethylenediamine glyphosate, hexamethylenediamine glyphosate, trimethylsulfonium glyphosate and mixtures thereof.

33. A storage-stable herbicidal concentrate as set forth in claim 31 containing said surfactant in a weight ratio to glyphosate acid equivalent of at least about 0.05.

34. A storage-stable herbicidal concentrate as set forth in claim 31 containing said surfactant in a weight ratio to glyphosate acid equivalent between about 0.05 and about 0.33.

35. A storage-stable herbicidal concentrate as set forth in claim 29 wherein anisotropic aggregates are formed in said plant foliage upon application to said foliage of said application mixture and evaporation of water from the application mixture on said foliage.

36. A storage-stable herbicidal concentrate as set forth in claim 29, 31 or 35 wherein the concentrate comprises potassium glyphosate.

37. A storage-stable herbicidal concentrate as set forth in claim 29, 30, 31 or 35 wherein the glyphosate concentration is from about 500 g a.e./L to about 600 g a.e./L.

38. A storage-stable herbicidal concentrate of claim 29, 30, 31, 35 or 37 wherein the concentrate has a cloud point of at least about 50.degree. C. and a crystallization point of not higher than about 0.degree. C.

39. A storage-stable herbicidal concentrate of claim 29, 30, 31, or 35 wherein the concentrate has a density of at least about 1.210 grams/liter.

40. A storage-stable herbicidal concentrate of claim 29, 30, 31, or 35 wherein the surfactant comprised by the concentrate is not substantially antagonistic to the herbicidal activity of the glyphosate.

41. A storage-stable herbicidal concentrate of claim 38 wherein the concentrate has a cloud point of at least about 60.degree. C. and a crystallization point of not higher than about -10.degree. C.

42. A storage-stable herbicidal concentrate of claim 29, 30, 31, 35, 37, or 38 wherein the concentrate has a viscosity of less than about 1000 c.p. at 0.degree. C. at 45/s shear rate.

43. A storage-stable herbicidal concentrate of claim 42 wherein the concentrate has a viscosity of less than about 250 c.p. at 0.degree. C. at 45/s shear rate.

48. A formulation of claim 44 wherein the surfactant comprised by the formulation is not substantially antagonistic to the herbicidal activity of the glyphosate.

52. A storage-stable herbicidal concentrate which may be diluted with water to provide an aqueous herbicidal application mixture for application to the foliage of a plant, said concentrate comprising glyphosate or a salt or ester thereof in a concentration of at least about 350 g/l glyphosate acid equivalent, and a surfactant component, the nature and concentration of said surfactant component in said concentrate being such that, upon applying said application mixture to the foliage of a plant, anisotropic aggregates comprising said surfactant are formed within the cuticles of the plant foliage.

53. A storage-stable herbicidal concentrate as set forth in claim 52 wherein, the nature and concentration of said surfactant component in said concentrate are such that, upon applying said application mixture to the foliage of a plant, liquid crystals comprising said surfactant are formed within the cuticles of the plant foliage.

54. A storage-stable herbicidal concentrate of claim 52 or 53 wherein the concentrate has a cloud point of at least about 50.degree. C. and a crystallization point of not higher than about 0.degree. C.

55. A storage-stable herbicidal concentrate of claim 54 wherein the concentrate has a cloud point of at least about 60.degree. C. and a crystallization point of not higher than about -10.degree. C.

56. A storage stable herbicidal concentrate which may be diluted with water to provide an aqueous herbicidal application mixture for application to the foliage of a plant, said concentrate comprising a potassium, monoammonium, diammonium, sodium, monoethanolamine, n-propylamine, ethylamine, ethylenediamine, hexamethylenediamine, or trimethylsulfonium salt of glyphosate and having a glyphosate acid equivalent concentration of at least 270 grams per liter, the nature of said surfactant and the composition of said concentrate being such that, upon application to a plant of the concentrate or said application mixture, anisotropic aggregates comprising said surfactant are formed on said plant foliage.

57. A storage stable herbicidal concentrate as set forth in claim 56 wherein the nature and concentration of said surfactant component in said concentrate are such that, upon applying said application mixture to the foliage of a plant, liquid crystals comprising said surfactant are formed within the cuticles of the plant foliage.

59. A storage stable herbicidal concentrate of claim 52 or 53 wherein the concentrate comprises a salt of glyphosate selected from the group consisting of potassium glyphosate, monoammonium glyphosate, diammonium glyphosate, sodium glyphosate, monoethanolamine glyphosate, n-propylamine glyphosate, ethylamine glyphosate, ethylenediamine glyphosate, hexamethylenediamine glyphosate, trimethylsulfonium glyphosate and mixtures thereof.

66. A concentrate of claim 52, 53, 56, or 57 wherein the surfactant comprised by the concentrate is not substantially antagonistic to the herbicidal activity of the glyphosate.

76. A formulation of claim 67 wherein the surfactant comprised by the formulation is not substantially antagonistic to the herbicidal activity of the glyphosate.

86. A formulation of claim 77, 78 or 79 wherein the surfactant comprising the formulation is not substantially antagonistic to the herbicidal activity of the glyphosate.

91. An aqueous herbicidal concentrate composition comprising (a) glyphosate, predominantly in the form of the potassium salt thereof, in solution in an amount of

in excess of 300 grams acid equivalent per liter of the composition; and (b) a surfactant component in solution or stable suspension, emulsion or dispersion, comprising one or more surfactants in a total amount of about 20 to about 300 grams per liter of the composition; wherein the composition has a viscosity of less than about 250 centipoise at 0.degree. C. at 45/s shear rate.

92. An aqueous herbicidal concentrate composition comprising (a) glyphosate, predominantly in the form of the potassium salt thereof, in solution in an amount of in excess of 300 grams acid equivalent per liter of the composition; and (b) a surfactant component in solution or stable suspension, emulsion or dispersion, comprising one or more surfactants in a total amount of about 20 to about 300 grams per liter of the composition; wherein the composition when free of dye or a coloring agent has a Gardner color value of not more than 14.

93. An aqueous herbicidal concentrate composition comprising (a) glyphosate, predominantly in the form of the potassium salt thereof, in solution in an amount of in excess of 300 grams acid equivalent per liter of the composition; and (b) a surfactant component in solution or stable suspension, emulsion or dispersion, comprising one or more surfactants in a total amount of about 20 to about 300 grams per liter of the composition; wherein the composition has a viscosity less than a similarly loaded glyphosate potassium salt composition comprising an alkylpolyglycoside surfactant in combination with an alkoxylated alkylamine surfactant, said alkylpolyglycoside and alkylamine surfactants being present in a weight ratio between about 5:1 and 1:1.

94. An aqueous herbicidal concentrate composition comprising (a) glyphosate, predominantly in the form of the potassium salt thereof, in solution in said water in an amount of in excess of 300 grams acid equivalent per liter of the composition; and (b) a surfactant component in solution or stable suspension, emulsion, or dispersion in said water, comprising one or more surfactants in a total amount of about 20 to about 300 grams per liter of the composition; wherein said surfactant component contains no effective amount of an alkylpolyglycoside and is selected such that the composition remains substantially homogeneous when stored at 50.degree. C. for about 14 to 28 days.

95. An aqueous herbicidal concentrate composition comprising (a) glyphosate, predominantly in the form of the potassium salt thereof, in solution in said water in an amount of in excess of 300 grams acid equivalent per liter of the composition; and (b) a surfactant component in solution or stable suspension, emulsion, or dispersion in said water, comprising one or more surfactants in a total amount of about 20 to about 300 grams per liter of the composition; wherein said surfactant component contains an effective amount of alkylpolyglycoside, in combination with at least one additional surfactant that contains no effective amount of an alkoxylated alkylamine.

96. An aqueous herbicidal concentrate composition comprising (a) glyphosate, predominantly in the form of the potassium salt thereof, in solution in said water in an amount of in excess of 300 grams acid equivalent per liter of the composition; and (b) a surfactant component in solution or stable suspension, emulsion, or dispersion in said water, comprising one or more surfactants in a total amount of about 20 to about 300 grams per liter of the composition; wherein the composition controls velvetleaf growth to a greater extent than a similarly loaded glyphosate potassium salt composition comprising an alkylpolyglycoside surfactant in combination with an alkoxylated alkylamine surfactant in a weight ratio of alkylpolyglycoside to alkylamine surfactant of between about 5:1 and 1:1.

97. An aqueous herbicidal concentrate composition comprising (a) glyphosate, predominantly in the form of the potassium salt thereof, in solution in said water in an amount in excess of 300 grams acid equivalent per liter of the composition; and (b) a surfactant component in solution or stable suspension, emulsion, or dispersion in said water, comprising one or more surfactants in a total amount of about 20 to about 300 grams per liter of the composition; wherein the composition has a viscosity of less than about 250 centipoise at 0.degree. C. at 45/s shear rate, and said surfactant component comprises one or more amine or quaternary ammonium salt compounds, each of which comprises an alkyl or aryl substituent having

from about 4 to about 16 carbon atoms and not more than ten ethylene oxide linkages within the compound, said compounds being present in an amount which enhances the compatibility of said surfactant component with said glyphosate salt.

98. An aqueous herbicidal concentrate composition comprising (a) glyphosate, or a salt or ester thereof, in solution in said water in an amount in excess of 300 grams acid equivalent per liter of the composition; and (b) a surfactant component in solution or stable suspension, emulsion, or dispersion in said water, comprising one or more surfactants in a total amount of about 20 to about 300 grams per liter of the composition; wherein said surfactant component comprises one or more amine or quaternary ammonium salt compounds, each of which comprises an alkyl or aryl substituent having from about 4 to about 16 carbon atoms and not more than ten ethylene oxide linkages within the compound, said compounds being present in an amount which enhances the compatibility of said surfactant component with the glyphosate.

104. A composition of claim 102 or 103 wherein the pesticide comprises a herbicide.

105. A composition of claim 104 wherein the herbicide comprises glyphosate or a salt or ester thereof.

107. An aqueous herbicidal composition comprising: (a) glyphosate or a salt or ester thereof; and (b) an agriculturally useful amount of at least one surfactant compound of claim 100.

108. An aqueous herbicidal composition comprising (a) glyphosate, predominantly in the form of the potassium, monoammonium, diammonium, sodium, monoethanolamine, n-propylamine, ethylamine, ethylenediamine, hexamethylened iamine or trimethylsulfonium salt thereof; and (b) an agriculturally useful amount of at least one surfactant compound of claim 100.

110. An aqueous herbicidal concentrate composition comprising: (i) glyphosate predominantly in the form of the potassium, monoammonium, diammonium, sodium, monoethanolamine, n-propylamine, ethylamine, ethylenediamine, hexamethylenediamine or trimethylsulfonium salt thereof, in solution in said water in an amount of in excess of 300 grams acid equivalent per liter of the composition; and (ii) a surfactant component comprising one or more surfactant(s) in a total amount of about 20 to about 300 grams per liter of composition, said surfactant(s) being selected from the group consisting of: (a) a secondary or tertiary amine having the formula: 175 wherein R.sup.1and R.sup.2 are hydrocarbyl having from 1 to about 30 carbon atoms, and R.sup.3 is hydrogen or hydrocarbyl having from 1 to about 30 carbon atoms; (b) monoalkoxylated amines having the formula: 176 wherein R.sup.1and R.sup.4 are independently hydrocarbyl or substituted hydrocarbyl groups having from 1 to about 30 carbon atoms or --R.sup.5SR.sup.6, R.sup.2 in each of the x (R.sup.2O) groups is independently C.sub.2-C.sub.4 alkylene, R.sup.3 is hydrogen, or a linear or branched alkyl group having from 1 to about 4 carbon atoms, R.sup.5 is a linear or branched alkyl group having from about 6 to about 30 carbon atoms, R.sup.6 is a hydrocarbyl or substituted hydrocarbyl group having from 4 to about 15 carbon atoms and x is an average number from 1 to about 60; (c) dialkoxylated quaternary ammonium salt having the formula: 177 wherein R.sup.1 is hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, R.sup.2 in each of the x (R.sup.2O) and y (R.sup.2O) groups is independently C.sub.2-C.sub.4 alkylene, R.sup.3 is hydrogen, or a linear or branched alkyl group having from 1 to about 4 carbon atoms, R.sup.4 is hydrogen or hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, x and y are independently an average number from 1 to about 40, and X-- is an agriculturally acceptable anion; (d) monoalkoxylated quaternary ammonium salts having the formula: 178 wherein R.sup.1and R.sup.5 are independently hydrogen or hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, R.sup.4 is hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, R.sup.2 in each of the x (R.sup.2O) groups is independently C.sub.2-C.sub.4 alkylene, R.sup.3 is hydrogen, or a linear or branched alkyl group having from 1 to about 30 carbon atoms, x is an average number from 1 to about 60, and X-- is an agriculturally acceptable anion; (e) quaternary ammonium salts having the formula: 179 wherein R.sup.1, R.sup.3 and R.sup.4 are independently hydrogen or hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon

atoms, R.sup.2 is hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, and X-- is an agriculturally acceptable anion; (f) ether amines having the formula: 180 wherein R.sup.1 is hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms; R.sup.2 is hydrocarbylene or substituted hydrocarbylene having from 2 to about 30 carbon atoms; R.sup.3 and R.sup.4 are independently hydrogen, hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, or --(R.sup.5O).sub.xR.sup.6, R.sup.5 in each of the x(R.sup.5-O) groups is independently C.sub.2-C.sub.4 alkylene, R.sup.6 is hydrogen, or a linear or branched alkyl group having from 1 to about 4 carbon atoms, and x is an average number from 1 to about 50; (g) diamines having the formula: 181 wherein R.sup.1, R.sup.3, R.sup.4 and R.sup.5 are independently hydrogen, hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, or --(R.sup.6O).sub.xR.sup.7; R.sup.2 and R.sup.8 are independently hydrocarbylene or substituted hydrocarbylene having from 2 to about 30 carbon atoms, R.sup.6 in each of the x (R.sup.6O) and y (R.sup.6O) groups is independently C.sub.2-C.sub.4 alkylene, R.sup.7 is hydrogen, or a linear or branched alkyl group having from 1 to about 30 carbon atoms, x is an average number from 1 to about 30, X is --O--, --N(R.sup.6)--, --C(O)--, --C(O)O--, --OC(O)--, --N(R.sup.9)C(O)--, --C(O)N(R.sup.9)--, --S--, --SO--, or --SO.sub.2--, y is 0 or an average number from 1 to about 30, n and z are independently 0 or 1, and R.sup.9 is hydrogen or hydrocarbyl or substituted hydrocarbyl; (h) amine oxides having the formula: 182 wherein R.sup.1, R.sup.2 and R.sup.3 are independently hydrogen, hydrocarbyl or substituted hydrocarbyl, --(R.sup.4O).sub.xR.sup.5, or --R.sup.6(OR.sup.4).sub.xOR.sup.5; R.sup.4 in each of the x (R.sup.4O) groups is independently C.sub.2-C.sub.4 alkylene, R.sup.5 is hydrogen, or a linear or branched alkyl group having from 1 to about 30 carbon atoms, R.sup.6 is hydrocarbylene or substituted hydrocarbylene having from 2 to about 6 carbon atoms, x is an average number from 1 to about 50, and the total number of carbon atoms in R.sup.1, R.sup.2 and R.sup.3 is at least 8; (i) dialkoxylated amines having the formula: 183 wherein R.sup.1 is a linear or branched alkyl, linear or branched alkenyl, linear or branched alkynyl, aryl, or aralkyl group having from about 6 to about 30 carbon atoms, or --R.sup.4SH, R.sup.2 in each of the x (R.sup.2O) and the y (R.sup.2O) groups is independently C.sub.2-C.sub.4 alkylene, R.sup.3 is hydrogen, or a linear or branched alkyl group having from 1 to about 4 carbon atoms, R.sup.4 is a linear or branched alkyl group having from about 6 to about 30 carbon atoms, and x and y are independently an average number from 1 to about 40; (j) aminated alkoxylated alcohols having the following chemical structure: 184 wherein R.sup.1, R.sup.7, R.sup.8, and R.sup.9 are each independently hydrogen, hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, or --(R.sup.11).sub.s(R.sup.3O).sub.vR.s- up.10; X is --O--, --OC(O), --C(O)O--, --N(R.sup.12)C(O)--, --C(O)N(R.sup.12)--, --S--, --SO--, --SO.sub.2-- or --N(R.sup.9)--; R.sup.3 in each of the n (R.sup.3O) groups and the v (R.sup.3O) groups is independently C.sub.2-C.sub.4 alkylene; R.sup.10 is hydrogen, or a linear or branched alkyl group having from 1 to about 30 carbon atoms; n is an average number from 1 to about 60; v is an average number from 1 to about 50; R.sup.2 and R.sup.11 are each independently hydrocarbylene or substituted hydrocarbylene having from 1 to about 6 carbon atoms; R.sup.4 is hydrocarbylene or substituted hydrocarbylene having from 2 to about 6 carbon atoms; R.sup.12 is hydrogen or hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms; m and s are each independently 0 or 1; R.sup.6 is hydrocarbylene or substituted hydrocarbylene having from 2 to about 30 carbon atoms, --C(:dbd.NR.sup.12)--, --C(S)--, or --C(O)--; q is an integer from 0 to 5; and R.sup.5 is hydrogen or hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms; (k) quaternary ammonium, sulfonium and sulfoxonium salts having the formula: 185 wherein R.sup.1, R.sup.7, R.sup.8, R.sup.9, R.sup.10 and R.sup.11 are independently hydrogen, hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, or --(R.sup.13).sub.s(R.sup.3O).sub.vR.sup.12; X is --O--, --OC(O), --N(R.sup.14)C(O)--, --C(O)N(R.sup.14)--, --C(O)O--, or --S--; R.sup.3 in each of the n (R.sup.3O) groups and v (R.sup.3O) groups is independently C.sub.2-C.sub.4 alkylene; R.sup.12 is hydrogen, or a linear or branched alkyl group having from 1 to about 30 carbon atoms; n is an average number from 1 to about 60; v is an average number from 1 to about 50; R.sup.2 and R.sup.13 are each independently hydrocarbylene or substituted hydrocarbylene having from 1 to about 6 carbon atoms; m and s are each independently 0 or 1; R.sup.4 is hydrocarbylene or substituted hydrocarbylene having from 2 to about 6 carbon atoms; R.sup.6 is hydrocarbylene or

substituted hydrocarbylene having from 2 to about 30 carbon atoms, --C(.dbd.NR.sup.12)--, --C(S)--, or --C(O)--; R.sup.14 is hydrogen or hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, q is an integer from 0 to 5; R.sup.5 is hydrogen or hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms; and each k is an agriculturally acceptable anion; (l) a diamine or diammonium salt having the formula: 186 wherein R.sup.1, R.sup.4, R.sup.5, R.sup.6, R.sup.7 and R.sup.8 are independently hydrogen or hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, R.sup.2 in each of the m (R.sup.2O) and n (R.sup.2O) groups and R.sup.9 are independently C.sub.2-C.sub.4 alkylene, R.sup.3 is hydrocarbylene or substituted hydrocarbylene having from about 2 to about 6 carbon atoms or --(R.sup.2O).sub.pR--, m and n are individually an average number from 0 to about 50, and p is an average number from 0 to about 60; (m) alkoxylated alcohols having the formula: R.sup.1O--(R.sup.2O).sub.xR.sup.3 (80) wherein R.sup.1 is hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, R.sup.2 in each of the x (R.sup.2O) groups is independently C.sub.2-C.sub.4 alkylene, R.sup.3 is hydrogen, or a linear or branched alkyl group having from 1 to about 4 carbon atoms, and x is an average number from 1 to about 60; (n) alkoxylated dialkylphenols having the formula: 187 wherein R.sup.1and R.sup.4 are independently hydrogen, or a linear or branched alkyl group having from 1 to about 30 carbon atoms and at least one of R.sup.1and R.sup.4 is an alkyl group, R.sup.2 in each of the x (R.sup.2O) groups is independently C.sub.2-C.sub.4 alkylene, R.sup.3 is hydrogen, or a linear or branched alkyl group having from 1 to about 4 carbon atoms, and x is an average number from 1 to about 60; and mixtures thereof.

111. The composition of any one of claims 91, 92, 94-99, 106, or 108-110 wherein the composition has a viscosity less than a similarly loaded glyphosate potassium salt composition comprising an alkylpolyglycoside surfactant in combination with an alkoxylated alkylamine surfactant in a weight ratio of alkylglycoside to alkylamine surfactant of between about 5:1 and 1:1.

142. A composition of any one of claims 91-99 or 110-141 wherein the surfactant comprised by the composition is not substantially antagonistic to the herbicidal activity of the glyphosate.

143. A herbicidal method comprising diluting in a suitable volume of water a herbicidally effective amount of a composition of any one of claims 91-99 or 110-142 to form an application composition, and applying the application composition to foliage of a plant or plants.

144. A herbicidal method comprising mixing a surfactant composition of claim 101 with a herbicide to form a herbicidal composition, diluting in a suitable volume of water a herbicidally effective amount of the herbicidal composition to form an application composition, and applying the application composition to foliage of a plant or plants.

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☐ 1. Document ID: US 6281181 B1

L18: Entry 1 of 3 File: USPT Aug 28, 2001

US-PAT-NO: 6281181
DOCUMENT-IDENTIFIER: US 6281181 B1

TITLE: Light-duty liquid or gel dishwashing detergent compositions comprising mid-chain branched surfactants

DATE-ISSUED: August 28, 2001

INVENTOR-INFORMATION:

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US-CL-CURRENT: 510/235; 510/424, 510/426, 510/427

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw. Desc | Image

☐ 2. Document ID: US 6153577 A

L18: Entry 2 of 3 File: USPT Nov 28, 2000

US-PAT-NO: 6153577
DOCUMENT-IDENTIFIER: US 6153577 A

TITLE: Polyoxyalkylene surfactants

DATE-ISSUED: November 28, 2000

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Cripe; Thomas Anthony	Loveland	OH		
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US-CL-CURRENT: 510/356; 510/505, 510/506

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
Draw Desc | Image

☐ 3. Document ID: US 6093856 A

L18: Entry 3 of 3 File: USPT Jul 25, 2000

US-PAT-NO: 6093856
DOCUMENT-IDENTIFIER: US 6093856 A

TITLE: Polyoxyalkylene surfactants

DATE-ISSUED: July 25, 2000

INVENTOR-INFORMATION:

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Willman; Kenneth William	Fairfield	OH		

US-CL-CURRENT: 568/625; 568/622

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
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L18: Entry 1 of 3 File: USPT Aug 28, 2001

DOCUMENT-IDENTIFIER: US 6281181 B1
TITLE: Light-duty liquid or gel dishwashing detergent compositions comprising mid-chain branched surfactants

Brief Summary Text (19):
The compositions of the present invention can also optionally comprise a suds booster/stabilizer selected from betaine surfactants, alkanol fatty acid amides, amine oxide semipolar nonionic surfactants and C.sub.8 -C.sub.22 alkylpolyglycosides. Combinations of these suds booster/stabilizers may also be utilized.

Brief Summary Text (173):
A conventional bromoalcohol is reacted with triphenylphosphine followed by sodium hydride, suitably in dimethylsulfoxide/tetrahydrofuran, to form a Wittig adduct. The Wittig adduct is reacted with an alpha methyl ketone, forming an internally unsaturated methyl-branched alcoholate. Hydrogenation followed by alkoxylation and/or sulfation yields the desired mid-chain branched primary alkyl surfactant. Although the Wittig approach does not allow the practitioner to extend the hydrocarbon chain, as in the Grignard sequence, the Wittig typically affords higher yields. See Agricultural and Biological Chemistry, M. Horiike et al., vol. 42 (1978), pp 1963-1965 included herein by reference.

Brief Summary Text (205):
Other anionic surfactants usefuil for detersive purposes can also be included in the compositions hereof. These can include salts (including, for example, sodium, potassium, ammonium, and substituted ammonium salts such as mono-, di- and triethanolamine salts) of soap, C.sub.9 C.sub.15 linear alkylbenzenesulphonates, C.sub.8 -C.sub.22 primary or secondary alkanesulphonates, C.sub.9 -C.sub.22 olefin sulphonates, sulphonated polycarboxylic acids prepared by sulphonation of the pyrolyzed product of alkaline earth metal citrates, e.g., as described in British patent specification No. 1,082,179, C.sub.8-22 alkyl glycerol sulfonates, fatty acyl glycerol sulfonates, fatty oleyl glycerol sulfates, C.sub.11-16 secondary soaps, alkyl phenol ethylene oxide ether sulfates, paraffin sulfonates, alkyl phosphates, isethionates such as the acyl isethionates, N-acyl taurates, fatty acid amides of methyl tauride, alkyl succinamates and sulfosuccinates, monoesters of sulfosuccinate (especially saturated and unsaturated C.sub.12 -C.sub.18 monoesters) diesters of sulfosuccinate (especially saturated and unsaturated C.sub.6 -C.sub.14 diesters), N-acyl sarcosinates, sulfates of alkylpolysaccharides such as the sulfates of alkylpolyglucoside (the nonionic nonsulfated compounds being described below), branched primary alkyl sulfates, C.sub.12-16 alkyl polyalkoxy carboxylates such as those of the formula RO(CH.sub.2 CH.sub.2 O).sub.k CH.sub.2 COO-M.sup.+ wherein R is a C.sub.8 -C.sub.22 alkyl, k is an integer from 0 to 10, and M is a soluble salt-forming cation, and fatty acids esterified with isethionic acid and neutralized with sodium hydroxide. Resin acids and hydrogenated resin acids are also suitable, such as rosin, hydrogenated rosin, and resin acids and hydrogenated resin acids present in or derived from tall oil. Further examples are given in "Surface Active Agents and Detergents" (Vol. I and II by Schwartz, Perry and Berch). A variety of such surfactants are also generally disclosed in U.S. Pat. No. 3,929,678, issued Dec. 30, 1975 to Laughlin, et al. at Column 23, line 58 through Column 29, line 23.

Brief Summary Text (225):
Alkylpolysaccharides disclosed in U.S. Pat. No. 4,565,647, Llenado, issued Jan. 21,

1986, having a hydrophobic group containing from about 6 to about 30 carbon atoms, preferably from about 10 to about 16 carbon atoms and a polysaccharide, e.g., a polyglycoside, hydrophilic group containing from about 1.3 to about 10, preferably from about 1.3 to about 3, most preferably from about 1.3 to about 2.7 saccharide units. Any reducing saccharide containing 5 or 6 carbon atoms can be used, e.g., glucose, galactose and galactosyl moieties can be substituted for the glucosyl moieties. (Optionally the hydrophobic group is attached at the 2-, 3-, 4-, etc. positions thus giving a glucose or galactose as opposed to a glucoside or galactoside.) The intersaccharide bonds can be, e.g., between the one position of the additional saccharide units and the 2-, 3-, 4-, and/or 6-positions on the preceding saccharide units.

Brief Summary Text (227):
The preferred alkylpolyglycosides have the formula

Brief Summary Text (230):
The compositions herein can further include from about 2% to 8%, preferably from about 3% to 6%, of a suds booster or stabilizer component such as betaine surfactants, fatty acid alkanol amides, amine oxide semi-polar nonionic surfactants, and C.sub.8-22 alkyl polyglycosides. Combinations of these suds boosters/stabilizers can also be used.

Brief Summary Text (239):
Other surfactants suitable for use as suds boosters/stabilizers in the compositions herein are the nonionic fatty alkylpolyglycosides. Such materials have the formula:

Brief Summary Text (240):
wherein Z is derived from glucose, R is a hydrophobic group selected from alkyl, alkylphenyl, hydroxyalkylphenyl, and mixtures thereof in which said alkyl groups contain from 8 to 22, preferably from 12 to 14 carbon atoms; n is 2 or 3 preferably 2, y is from 0 to 10, preferably 0; and x is from 1.5 to 8, preferably from 1.5 to 4, most preferably from 1.6 to 2.7. U.S. Pat. Nos. 4,393,203 and 4,732,704, incorporated herein by reference, describe these alkyl polyglycoside surfactants.

Brief Summary Text (302):
It has been determnined that substituents and structural modifications that lower pK1 and pK2 to below about 8.0 are undesirable and cause losses in performance. This can include substitutions that lead to ethoxylated diamines, hydroxy ethyl substituted diamines, diamines with oxygen in the beta (and less so gamma) position to the nitrogen in the spacer group (e.g., Jeffamine EDR 148). In addition, materials based on ethylene diamine are unsuitable.

CLAIMS:

1. An aqueous light duty liquid dishwashing detergent composition comprising:

from 5% to 70% by weight of a surfactant system which comprises at least 10%, by weight of a branched surfactant mixture, said branched surfactant mixture comprising mid-chain branched and linear surfactant compounds, said linear compounds comprising less than 25%, by weight of the branched surfactant mixture and said mid-chain branched compounds being of the formula:

A.sup.b -B

wherein:

A.sup.b is a hydrophobic C9 to C18, total carbons in the moiety, mid-chain branched alkyl moiety having: (1) a longest linear carbon chain attached to the--B moiety in the range of from 8 to 17 carbon atoms; (2) one or more C.sub.1 -C.sub.3 alkyl moieties branching from this longest linear carbon chain; (3) at least one of the branching alkyl moieties is attached directly to a carbon of the longest linear carbon chain at a position within the range of position 3 carbon, counting from carbon #1 which is attached to the--B moiety, to position .omega.-2 carbons the terminal carbon minus 2 carbons; and (4) the surfactant composition has an average total number of carbon atoms in the A.sup.b moiety in the above formula within the

range of greater than 12 to 14.5; and B is a hydrophilic moiety selected from the group consisting of OSO.sub.3 M, (EO/PO)mOSO.sub.3 M, (EO/PO)mOH and mixtures thereof, wherein EO/PO are alkoxy moieties selected from the group consisting of ethoxy, propoxy, and mixtures thereof, and in is at least 0.01 to 30; and

from 1% to 10% by weight of a suds booster/stabilizer selected from the group consisting of betaine surfactants, alkanol fatty acid amides, amine oxide semi-polar nonionic surfactants, C.sub.8 -C.sub.22 alkylpolyglycosides, and combinations thereof.

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L18: Entry 2 of 3 File: USPT Nov 28, 2000

DOCUMENT-IDENTIFIER: US 6153577 A
TITLE: Polyoxyalkylene surfactants

Brief Summary Text (120):
A conventional bromoalcohol is reacted with triphenylphosphine followed by sodium hydride, suitably in dimethylsulfoxide/tetrahydrofuran, to form a Wittig adduct. The Wittig adduct is reacted with an alpha methyl ketone, forming an internally unsaturated methyl-branched alcoholate. Hydrogenation followed by alkoxylation yields the desired mid-chain branched primary alkyl polyoxyalkylene. Although the Wittig approach does not allow the practitioner to extend the hydrocarbon chain, as in the Grignard sequence, the Wittig typically affords higher yields. See Agricultural and Biological Chemistry, M. Horiike et al., vol. 42 (1978), pp 1963-1965 included herein by reference.

Detailed Description Text (98):
The detergent compositions according to the present invention preferably further comprise additional surfactants, herein also referred to as co-surfactants. It is to be understood that the branched-chain surfactants prepared in the manner of the present invention may be used singly in cleaning compositions or in combination with other detersive surfactants. Typically, fully-formulated cleaning compositions will contain a mixture of surfactant types in order to obtain broad-scale cleaning performance over a variety of soils and stains and under a variety of usage conditions. One advantage of the branched-chain surfactants herein is their ability to be readily formulated in combination with other known surfactant types. Nonlimiting examples of additional surfactants which may be used herein typically at levels from about 1% to about 55%, by weight, include the unsaturated sulfates such as oleyl sulfate, the C.sub.10 -C.sub.18 alkyl alkoxy sulfates ("AE.sub.X S"; especially EO 1-7 ethoxy sulfates), C.sub.10 -C.sub.18 alkyl alkoxy carboxylates (especially the EO 1-5 ethoxycarboxylates), the C.sub.10-18 glycerol ether sulfates, the C.sub.10 -C.sub.18 alkyl polyglycosides and their corresponding sulfated polyglycosides, and C.sub.12 -C.sub.18 alpha-sulfonated fatty acid esters. Nonionic surfactants such as the ethoxylated C.sub.10 -C.sub.18 alcohols and alkyl phenols, (e.g., C.sub.10 -C.sub.18 EO (1-10) can also be used. If desired, other conventional surfactants such as the C.sub.12 -C.sub.18 betaines and sulfobetaines ("sultaines"), C.sub.10 -C.sub.18 amine oxides, and the like, can also be included in the overall compositions. The C.sub.10 -C.sub.18 N-alkyl polyhydroxy fatty acid amides can also be used. Typical examples include the C.sub.12 -C.sub.18 N-methylglucamides. See WO 9,206,154. Other sugar-derived surfactants include the N-alkoxy polyhydroxy fatty acid amides, such as C.sub.10 -C.sub.18 N-(3-methoxypropyl) glucamide. The N-propyl through N-hexyl C.sub.12 -C.sub.18 glucamides can be used for low sudsing. C.sub.10 -C.sub.20 conventional soaps may also be used. If high sudsing is desired, the branched-chain C.sub.10 -C.sub.16 soaps may be used. C.sub.10 -C.sub.14 alkyl benzene sulfonates (LAS), which are often used in laundry detergent compositions, can also be used with the branched surfactants herein.

Detailed Description Text (102):
Nonlimiting examples of anionic co-surfactants useful herein, typically at levels. from about 0.1% to about 50%, by weight, include the conventional C.sub.11 -C.sub.18 alkyl benzene sulfonates ("LAS") and primary, branched-chain and random C.sub.10 -C.sub.20 alkyl sulfates ("AS"), the C.sub.10 -C.sub.18 secondary (2,3) alkyl sulfates of the formula CH.sub.3 (CH.sub.2).sub.x (CHOSO.sub.3.sup.- M.sup.+)CH.sub.3 and CH.sub.3 (CH.sub.2).sub.y (CHOSO.sub.3.sup.- M.sup.+) CH.sub.2

CH.sub.3 where x and (y+1) are integers of at least about 7, preferably at least about 9, and M is a water-solubilizing cation, especially sodium, unsaturated sulfates such as oleyl sulfate, the C.sub.10 -C.sub.18 alpha-sulfonated fatty acid esters, the C.sub.10 -C.sub.18 sulfated alkyl polyglycosides, the C.sub.10 -C.sub.18 alkyl alkoxy sulfates ("AEXS"; especially EO 1-7 ethoxy sulfates), and C.sub.10 -C.sub.18 alkyl alkoxy carboxylates (especially the EO 1-5 ethoxycarboxylates). The C.sub.12 -C.sub.18 betaines and sulfobetaines ("sultaines"), C.sub.10 -C.sub.18 amine oxides, and the like, can also be included in the overall compositions. C.sub.10 -C.sub.20 conventional soaps may also be used. If high sudsing is desired, the branched-chain C.sub.10 -C.sub.16 soaps may be used. Other conventional useful anionic co-surfactants are listed in standard texts.

Detailed Description Text (108):
Other anionic co-surfactants useful for detersive purposes can also be included in the laundry detergent compositions of the present invention. These can include salts (including, for example, sodium, potassium, ammonium, and substituted ammonium salts such as mono-, di- and triethanolamine salts) of soap, C.sub.8 -C.sub.22 primary of secondary alkanesulfonates, C.sub.8 -C.sub.24 olefinsulfonates, sulfonated polycarboxylic acids prepared by sulfonation of the pyrolyzed product of alkaline earth metal citrates, e.g., as described in British patent specification No. 1,082,179, C.sub.8 -C.sub.24 alkylpolyglycolethersulfates (containing up to 10 moles of ethylene oxide); alkyl glycerol sulfonates, fatty acyl glycerol sulfonates, fatty oleoyl glycerol sulfates, alkyl phenol ethylene oxide ether sulfates, paraffin sulfonates, alkyl phosphates, isethionates such as the acyl isethionates, N-acyl taurates, alkyl succinamates and sulfosuccinates, monoesters of sulfosuccinates (especially saturated and unsaturated C.sub.12 -C.sub.18 monoesters) and diesters of sulfosuccinates (especially saturated and unsaturated C.sub.6 -C.sub.12 diesters), sulfates of alkylpolysaccharides such as the sulfates of alkylpolyglucoside (the nonionic nonsulfated compounds being described below), and alkyl polyethoxy carboxylates such as those of the formula RO(CH.sub.2 CH.sub.2 O).sub.k --CH.sub.2 COO--M+ wherein R is a C.sub.8 -C.sub.22 alkyl, k is an integer from 0 to 10, and M is a soluble salt-forming cation. Resin acids and hydrogenated resin acids are also suitable, such as rosin, hydrogenated rosin, and resin acids and hydrogenated resin acids present in or derived from tall oil. Further examples are described in "Surface Active Agents and Detergents" (Vol. I and II by Schwartz, Perry and Berch). A variety of such surfactants are also generally disclosed in U.S. Pat. No. 3,929,678, issued Dec. 30, 1975 to Laughlin, et al. at Column 23, line 58 through Column 29, line 23 (herein incorporated by reference).

Detailed Description Text (124):
Nonlimiting examples of nonionic co-surfactants useful herein typically at levels from about 0.1% to about 50%, by weight include the alkoxylated alcohols 15 (AE's) and alkyl phenols, polyhydroxy fatty acid amides (PFAA's), alkyl polyglycosides (APG's), C.sub.10 -C.sub.18 glycerol ethers, and the like.

Detailed Description Text (128):
Also useful as a nonionic co-surfactant in the present invention are the alkylpolysaccharides such as those disclosed in U.S. Pat. No. 4,565,647, Llenado, issued Jan. 21, 1986, having a hydrophobic group containing from about 6 to about 30 carbon atoms, preferably from about 10 to about 16 carbon atoms, and a polysaccharide, e.g. a polyglycoside, hydrophilic group containing from about 1.3 to about 10, preferably from about 1.3 to about 3, most preferably from about 1.3 to about 2.7 saccharide units. Any reducing saccharide containing 5 or 6 carbon atoms can be used, e.g., glucose, galactose and galactosyl moieties can be substituted for the glucosyl moieties (optionally the hydrophobic group is attached at the 2-, 3-, 4-, etc. positions thus giving a glucose or galactose as opposed to a glucoside or galactoside). The intersaccharide bonds can be, e.g., between the one position of the additional saccharide units and the 2-, 3-, 4-, and/or 6-positions on the preceding saccharide units.

Detailed Description Text (129):
Preferred alkylpolyglycosides have the formula

Detailed Description Paragraph Table (18):

	T	U	V	W	X	Y

Nonionic surfactants MB15AE7 2.4 1.9 2.5 2 2 2.5 C24 E5 3.6 2.9 2.5 2.5 3.2 2.5 C23E3 -- -- -- -- 1.3 -- C24E21 1.0 0.8 4.0 -- 1.9 2.0 Anionic surfactants NaPS -- -- -- -- -- -- LAS -- -- -- -- 0.9 0.8 SCS 1.5 2.6 -- 2.3 1.2 1.5 Isalchem .RTM. AS 0.6 0.6 -- 2 2 -- Buffer Carbonate 0.6 0.13 0.6 1.0 1.0 0.1 Citrate 0.5 0.56 0.5 -- -- 0.6 Caustic 0.3 0.33 0.3 -- -- 0.3 Suds control Fatty Acid 0.6 0.3 0.5 0.4 0.4 0.5 Isofol 12 .RTM. 0.3 0.3 -- 0.3 0.3 0.3 Polymers PEG DME-2000 .RTM. 0.4 -- 0.3 -- -- 0.35 Jeffamine .RTM. ED-2001 -- 0.4 -- -- -- -- Polyglycol AM .RTM. 1100 -- -- -- 0.5 -- -- PVP K60 .RTM. -- 0.4 0.6 0.3 -- 0.3 PEG (2000) -- -- -- -- 0.5 -- Minors and water up to 100% pH 9.5 7.4 9.5 10.5 10.75 7.5

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☐ 1. Document ID: US 20030104944 A1

L26: Entry 1 of 20 File: PGPB Jun 5, 2003

PGPUB-DOCUMENT-NUMBER: 20030104944
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20030104944 A1

TITLE: Use of non-spreading silicone surfactants in agrochemical compositions

PUBLICATION-DATE: June 5, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Humble, Geoffrey David	Chesterfield	VA	US	
Kennedy, Michael Wayne	Glen Allen	VA	US	
Simpelkamp, Jorg	Richmond	VA	US	

US-CL-CURRENT: 504/206; 504/358

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw. Desc | Image

☐ 2. Document ID: US 20030104943 A1

L26: Entry 2 of 20 File: PGPB Jun 5, 2003

PGPUB-DOCUMENT-NUMBER: 20030104943
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20030104943 A1

TITLE: Novel surfactants and formulations

PUBLICATION-DATE: June 5, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Lennon, Patrick J.	Webster	MO	US	
Chen, Xiangyang	Chesterfield	MO	US	
Arhancet, Graciela B.	Creve Coeur	MO	US	
Glaenzer, Jeanette A.	University City	MO	US	
Gillespie, Jane L.	St. Louis	MO	US	
Graham, Jeffrey A.	Wildwood	MO	US	
Becher, David Z.	Point Court	MO	US	
Wright, Daniel R.	St. Louis	MO	US	
Agbaje, Henry E.	St. Louis	MO	US	
Xu, Xiaodong C.	Valley Park	MO	US	
Abraham, William	Wildwood	MO	US	
Brinker, Ronald J.	Ellisville	MO	US	
Pallas, Norman R.	Florissant	MO	US	
Wideman, Al S.	St. Louis	MO	US	
Mahoney, Martin D.	St. Peters	MO	US	
Henke, Susan L.	Webster Groves	MO	US	

US-CL-CURRENT: 504/206

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw. Desc | Image

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☐ 3. Document ID: US 20030096708 A1

L26: Entry 3 of 20 File: PGPB May 22, 2003

PGPUB-DOCUMENT-NUMBER: 20030096708
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20030096708 A1

TITLE: Pesticide concentrates containing etheramine surfactants

PUBLICATION-DATE: May 22, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Agbaje, Henry E.	St. Louis	MO	US	
Becher, David Z.	St. Louis	MO	US	
Bates, Chris	Ballwin	MO	US	
Seifert-Higgins, Simone	Pacific	MO	US	
Brinker, Ronald J.	Ellisville	MO	US	

US-CL-CURRENT: 504/365

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw. Desc | Image

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☐ 4. Document ID: US 20030087764 A1

L26: Entry 4 of 20 File: PGPB May 8, 2003

PGPUB-DOCUMENT-NUMBER: 20030087764
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20030087764 A1

TITLE: Stable liquid pesticide compositions

PUBLICATION-DATE: May 8, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Pallas, Norman R.	Florissant	MO	US	
Gillespie, Jane L.	St. Louis	MO	US	
Singh, Lata	Ellisville	MO	US	
Xu, Xiaodong C.	Valley Park	MO	US	

US-CL-CURRENT: 504/365

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
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☐ 5. Document ID: US 20020123430 A1

L26: Entry 5 of 20 File: PGPB Sep 5, 2002

PGPUB-DOCUMENT-NUMBER: 20020123430
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20020123430 A1

TITLE: Pesticide compositions containing oxalic acid

PUBLICATION-DATE: September 5, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Xu, Xiaodong C.	Valley Park	MO	US	
Brinker, Ronald J.	Ellisville	MO	US	
Reynolds, Tracey L.	Ballwin	MO	US	
Abraham, William	Wildwood	MO	US	
Graham, Jeffrey A.	Wildwood	MO	US	

US-CL-CURRENT: 504/206; 504/363

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
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☐ 6. Document ID: US 20020065199 A1

L26: Entry 6 of 20 File: PGPB May 30, 2002

PGPUB-DOCUMENT-NUMBER: 20020065199
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20020065199 A1

TITLE: Compact storage and shipping system for glyphosate herbicide

PUBLICATION-DATE: May 30, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Wright, Daniel R.	St. Louis	MO	US	

US-CL-CURRENT: 504/206

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
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☐ 7. Document ID: US 20010019997 A1

L26: Entry 7 of 20 File: PGPB Sep 6, 2001

PGPUB-DOCUMENT-NUMBER: 20010019997
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20010019997 A1

TITLE: Highly concentrated aqueous glyphosate compositions

PUBLICATION-DATE: September 6, 2001

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Wright, David R.	St. Louis	MO	US	

US-CL-CURRENT: 504/206; 504/362

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
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☐ 8. Document ID: US 6544930 B2

L26: Entry 8 of 20 File: USPT Apr 8, 2003

US-PAT-NO: 6544930
DOCUMENT-IDENTIFIER: US 6544930 B2

TITLE: Compact storage and shipping system for glyphosate herbicide

DATE-ISSUED: April 8, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Wright; Daniel R.	St. Louis	MO		

US-CL-CURRENT: 504/206

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
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☐ 9. Document ID: US 6475953 B1

L26: Entry 9 of 20 File: USPT Nov 5, 2002

US-PAT-NO: 6475953
DOCUMENT-IDENTIFIER: US 6475953 B1

TITLE: Composition and method for treating plants with exogenous chemicals

DATE-ISSUED: November 5, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Ward; Anthony J. I.	Clayton	MO		
Ge; Jisheng	Affton	MO		
Gillespie; Jane L.	St. Louis	MO		
Sandbrink; Joseph J.	Des Peres	MO		
Xu; Xiaodong C.	St. Louis	MO		

US-CL-CURRENT: 504/206; 504/358

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw Desc | Image

☐ 10. Document ID: US 6455473 B2

L26: Entry 10 of 20 File: USPT Sep 24, 2002

US-PAT-NO: 6455473
DOCUMENT-IDENTIFIER: US 6455473 B2

TITLE: Highly concentrated aqueous glyphosate compositions

DATE-ISSUED: September 24, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Wright; Daniel R.	St. Louis	MO		

US-CL-CURRENT: 504/206

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw Desc | Image

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☐ 11. Document ID: US 6277788 B1

L26: Entry 11 of 20 File: USPT Aug 21, 2001

US-PAT-NO: 6277788
DOCUMENT-IDENTIFIER: US 6277788 B1

TITLE: Highly concentrated aqueous glyphosate compositions

DATE-ISSUED: August 21, 2001

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Wright; Daniel R.	St. Louis	MO		

US-CL-CURRENT: 504/206

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw. Desc | Image

☐ 12. Document ID: US 6172004 B1

L26: Entry 12 of 20 File: USPT Jan 9, 2001

US-PAT-NO: 6172004
DOCUMENT-IDENTIFIER: US 6172004 B1

TITLE: Composition and method for treating plants with exogenous chemicals

DATE-ISSUED: January 9, 2001

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Brinker; Ronald J.	Ellisville	MO		
Gillespie; Jane L.	St. Louis	MO		
Raymond; Peter J.	Wildwood	MO		
Sandbrink; Joseph J.	Des Peres	MO		
Warner; James M.	Webster Groves	MO		
Wideman; Al S.	St. Louis	MO		
Wright; Daniel R.	St. Louis	MO		

US-CL-CURRENT: 504/127; 504/206

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw. Desc | Image

☐ 13. Document ID: US 6133199 A

L26: Entry 13 of 20 File: USPT Oct 17, 2000

US-PAT-NO: 6133199
DOCUMENT-IDENTIFIER: US 6133199 A

TITLE: Process and compositions promoting biological effectiveness of exogenous chemical substances in plants

DATE-ISSUED: October 17, 2000

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Soula; Gerard G.	Meyzieux			FR
Meyrueix; Remi	Lyons			FR
Lemercier; Alain J. L.	St Bonnet de Mure			FR
Bryson; Nathan J.	Millery			FR
Soula; Olivier	Lyons			FR
Ward; Anthony J. I.	Clayton	MO		
Gillespie; Jane L.	St. Louis	MO		
Brinker; Ronald J.	Ellisville	MO		

US-CL-CURRENT: 504/206; 504/365

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw. Desc | Image

☐ 14. Document ID: US 6130186 A

L26: Entry 14 of 20 File: USPT Oct 10, 2000

US-PAT-NO: 6130186
DOCUMENT-IDENTIFIER: US 6130186 A

TITLE: Composition and method for treating plants with exogenous chemicals

DATE-ISSUED: October 10, 2000

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Ward; Anthony J. I.	Clayton	MO		
Ge; Jisheng	Affton	MO		
Sandbrink; Joseph J.	Des Peres	MO		
Xu; Xiaodong C.	St. Louis	MO		

US-CL-CURRENT: 504/365; 504/206, 504/235, 504/250, 504/367, 514/561, 514/563, 514/772

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw. Desc | Image

☑ 15. Document ID: US 6117820 A

L26: Entry 15 of 20 File: USPT Sep 12, 2000

US-PAT-NO: 6117820
DOCUMENT-IDENTIFIER: US 6117820 A

TITLE: Agrochemical formulation

DATE-ISSUED: September 12, 2000

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Cutler; Julia Lynne	Bracknell			GB
Bean; Michael John	Bracknell			GB

US-CL-CURRENT: 504/206; 504/222, 504/250, 504/333, 504/362, 514/975

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw. Desc | Image

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☐ 16. Document ID: US 6093681 A

L26: Entry 16 of 20 File: USPT Jul 25, 2000

US-PAT-NO: 6093681
DOCUMENT-IDENTIFIER: US 6093681 A

TITLE: Composition and method for treating plants with exogenous chemicals

DATE-ISSUED: July 25, 2000

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Ward; Anthony J. I.	Clayton	MO		
Ge; Jisheng	Affton	MO		
Gillespie; Jane L.	St. Louis	MO		
Sandbrink; Joseph J.	Des Peres	MO		
Xu; Xiaodong C.	St. Louis	MO		

US-CL-CURRENT: 504/365; 504/206, 504/235, 504/250, 514/561, 514/563, 514/772

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw. Desc | Image

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☐ 17. Document ID: US 6020287 A

L26: Entry 17 of 20 File: USPT Feb 1, 2000

US-PAT-NO: 6020287
DOCUMENT-IDENTIFIER: US 6020287 A
**** See image for Certificate of Correction ****

TITLE: Process and compositions for enhancing reliability of exogenous chemical

substances applied to plants

DATE-ISSUED: February 1, 2000

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Brinker; Ronald Joseph	Ellisville	MO		
Gillespie; Jane Laura	St. Louis	MO		
Raymond; Peter Joseph	Wildwood	MO		
Sandbrink; Joseph Jude	Des Peres	MO		
Warner; James Michael	Webster Groves	MO		
Wideman; Al Steven	St. Louis	MO		
Wright; Daniel Richard	St. Louis	MO		

US-CL-CURRENT: 504/362; 504/206

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
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☑ 18. Document ID: US 6010979 A

L26: Entry 18 of 20 File: USPT Jan 4, 2000

US-PAT-NO: 6010979
DOCUMENT-IDENTIFIER: US 6010979 A

TITLE: Herbicidal composition

DATE-ISSUED: January 4, 2000

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Osborn; Martin Keith	Wokingham			GB
Bean; Michael John	Bracknell			GB
Wikeley; Philip Simon	Loughborough			GB

US-CL-CURRENT: 504/206

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
Draw Desc | Image

☐ 19. Document ID: US 5985793 A

L26: Entry 19 of 20 File: USPT Nov 16, 1999

US-PAT-NO: 5985793
DOCUMENT-IDENTIFIER: US 5985793 A

TITLE: Sequential application method for treating plants with exogenous chemicals

DATE-ISSUED: November 16, 1999

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Sandbrink; Joseph J.	Des Peres	MO		
Warner; James M.	University City	MO		
Wright; Daniel R.	St. Louis	MO		
Feng; Paul C. C.	Ellisville	MO		

US-CL-CURRENT: 504/363; 424/405, 504/206, 504/208, 504/212, 504/250, 504/253, 504/258, 504/274, 504/291, 504/323, 504/324, 504/339, 504/342, 504/347, 504/352

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw. Desc | Image

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☑ 20. Document ID: US 5888934 A

L26: Entry 20 of 20 File: USPT Mar 30, 1999

US-PAT-NO: 5888934
DOCUMENT-IDENTIFIER: US 5888934 A

TITLE: Herbicidal compositions and adjuvant composition comprising alkylpolyglycoside and ethoxylated alcohol surfactants

DATE-ISSUED: March 30, 1999

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Townson; Jane Karen	Maidenhead			GB
Hart; Clifford Arthur	Wokingham			GB
Osborn; Martin Keith	Wokingham			GB
Bean; Michael John	Bracknell			GB

US-CL-CURRENT: 504/206

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw. Desc | Image

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L26: Entry 15 of 20 File: USPT Sep 12, 2000

DOCUMENT-IDENTIFIER: US 6117820 A
TITLE: Agrochemical formulation

Abstract Text (1):
An aqueous agrochemical concentrate formulation comprises a) an agrochemical electrolyte such as salts of glyphosate, fomesafen, glufosinate, paraquat or bentazone, b) an alkoxylated adjuvant, c) an alkylglycoside and d) a co-surfactant which interacts with the alkylglycoside to form a structured aqueous system. Preferred co-surfactants are:- (i) a linear or branched chain aliphatic or aromatic alcohol, (ii) an alcohol or ester or alkyl phenol alkoxylate having a degree of alkoxylation lower than that of the alkoxylated adjuvant present in the formulation as component (b), (iii) a glyceryl alkyl or alkenyl ester and (iv) a sorbitan alkyl or alkenyl ester. The alkyl glycoside and the co-surfactant interact to provide a structured aqueous system such that if the critical concentrations are exceeded and one or more components (normally the alkoxylated adjuvant) can no longer be maintained in a single-phase aqueous system, the second phase forms a stable dispersion (normally a liquid phase dispersion) which is supported within the structured aqueous system.

Brief Summary Text (3):
One widely used and highly effective class of adjuvants is that obtained by alkoxylation of a nonionic or cationic substrate. For example, Wyrril and Burnside (Weed Science 1977 Vol 25 275-287) have shown that ethoxylated alcohols, esters and amines can be used to improve the biological performance of glyphosate. Particular problems can arise when alkoxylated adjuvants are combined with agrochernical electrolytes since all surfactants of the alkoxylate type undergo phase separation at a particular electrolyte concentration and temperature. One solution to this problem is to add a co-surfactant, solubiliser or hydrotrope that raises the cloud point of the alkoxylate, i.e., increases the electrolyte concentration or the temperature at which the phase separation occurs. Some success can be achieved in this area, for example, by adding a cationic surfactant to an alcohol ethoxylate, the alcohol ethoxylate can be formulated at a higher electrolyte concentration than would otherwise be possible. However this approach is of limited success in some instances, for example when high concentrations of the agrochemical electrolyte and the alkoxylate are required or if the formulation is required to be stable over a broad temperature range. Above a certain concentration of agrochemical electrolyte, unstable formulations would be produced at all practical temperatures.

Brief Summary Text (8):
c) an alkylglycoside

Brief Summary Text (9):
d) a co-surfactant which interacts with the alkylglycoside to form a structured aqueous system.

Brief Summary Text (11):
As examples of the co-surfactant which interacts with the alkylglycoside to form a structured aqueous system there may be mentioned compounds having a hydrophobic group in combination with a relatively small hydrophilic group for example:

Brief Summary Text (23):
The agrochemical electrolyte may be an active agrochemical or an agrochemical

enhancer such as ammonium sulphate or any other ionic species added to an agrochemical formulation. Suitable agrochemical actives which are agrochemical electrolytes are glyphosate (N-phosphonomethylglycine), which is commonly used in the form of its water-soluble salts such as trimethylsulphonium, isopropylamine, sodium, or ammonium salts, fomesafen which is commonly used in the form of its water-soluble sodium salt, glufosinate which is commonly used in the form of its water-soluble ammonium salt, paraquat dichloride and bentazone which is commonly used in the form of its water-soluble sodium salt. The use of an agrochemical enhancer or other additive which is itself an electrolyte may still further enhance the ionic strength of the composition, thereby increasing the potential stability problems. Thus, for example, glyphosate salts are commonly formulated or tank-mixed with ammonium sulphate as an activity enhancer, while magnesium sulphate may be added to paraquat as a purgative as disclosed for example in EP 0467529.

Brief Summary Text (30):
The alkylglycoside for use in the present invention may be obtained by the reaction of alkanols with glucose or other mono- or di- or polysaccharides. As used herein the term "alkylglycoside" includes an alkylmonoglycoside and an alkylpolyglycoside. Preferred alkylglycosides for use in the present invention are alkylglucosides obtained by the reaction of glucose with a straight or branched chain alkanol or mixture of alkanols, for example a mixture of alkanols containing 7 to 18, preferably 7 to 16 carbon atoms, for example 8 to 10 carbon atoms. The number of glycose groups per alkyl group in the molecule may vary and alkyl mono- or di- or polyglucose or saccharide derivatives are possible. Commercial alkylpolyglucosides usually contain a mixture of derivatives having an average number of glycose groups per alkyl group. Thus alkylglycosides have the general formula (I) ##STR1## wherein n is the degree of polymerisation and is typically within the range from 1 to 3, for example from 1 to 2, and R.sup.5 is a branched or straight chain alkyl group having from 4 to 18 carbon atoms or a mixture of alkyl groups having an average value within the given range. Typical of alkylglycosides is the product commercially available under the trade names AL2042 (Imperial Chemical Industries PLC) and AGRIMUL PG2067 (Henkel Corp) wherein n is an average of 1.7 and R.sup.5 is a mixture of octyl (45%) and decyl (55%), the product commercially available under the trade name AGRIMUL PG2069 (Henkel Corp) wherein n is an average of 1.6 and R.sup.5 is a mixture of nonyl (20%), decyl (40%) and undecyl (40%) and the product commercially available under the trade name BEROL AG6202 (Akzo Nobel) which is 2-ethyl-1-hexylglycoside.

Brief Summary Text (31):
As indicated previously, the agrochemical formulations of the present invention are preferably stable at relatively high ambient temperatures. It has been found that enhanced high temperature stability may be obtained by the inclusion of a minor proportion of an ionic surfactant (component e) which is different from the ethoxylated adjuvant (component b). It is believed that the presence of a minor proportion of an ionic surfactant in the formulation increases the amount of structuring that occurs, particularly at high temperatures. The addition of an ionic surfactant therefore offers another advantage, in that lower concentrations of the alkylglycoside and co-surfactant (d) can be used to produce stable formulations.

Brief Summary Text (33):
A wide range of suitable ionic surfactants (component e) will occur to those skilled in the art and those which have been found to enhance stability include cationic, anionic and amphoteric surfactants. Particularly suitable cationic surfactants include optionally ethoxylated amines, quaternary ammonium salts and amine oxides having at least one long chain (linear or branched) alkyl or alkenyl or alkyl aryl substituent containing from 8 to 20 carbon atoms in the alkyl or alkenyl group and a preferred mean ethylene oxide content of from 0 to 20, even more preferably from 0 to 5. Particularly suitable anionic surfactants include alkyl sulphates, alkyl carboxylates, alkyl sulphosuccinates, alkyl phosphates and alkylbenzene sulphonates and their drivatives having at least one long chain alkyl or alkenyl substituent containing from 8 to 20 carbon atoms. In some instances the additional ionic surfactant may even provide an increase in the activity of the composition.

Brief Summary Text (34):
Thus, for example, when the agrochemical electrolyte is glyphosate and is used with

a non-ionic ethoxylated adjuvant as component (b), especially preferred additional surfactants (component e) are cationic surfactants such as ethoxylated amines and optionally ethoxylated quaternary ammonium salts. Examples of suitable additional cationic surfactants include hexadecyl trimethyl ammonium chloride, coco trimethyl ammonium chloride and N-methyl cocoammonium chloride having a mean ethylene oxide content of 2.

Brief Summary Text (35):
As noted above, the advantages of the formulation of the present invention are fully realized at high concentrations of the agrochemical electrolyte and the alkoxylated adjuvant such that, in the absence of the co-surfactant which interacts with the alkylglycoside to form a structured aqueous system (component d), one or more component (usually the alkoxylated adjuvant) undergoes inhomogeneous phase separation, thereby destroying the homogeneity of the concentration of the components within the formulation. In particular, the concentration of the agrochemical electrolyte may be at the higher end of that found in practice for formulations of the agrochemical electrolyte. Such typical concentrations will be known to those skilled in the art or may be determined by routine experimentation in respect of the agrochemical electrolyte concerned.

Brief Summary Text (36):
The agrochemical glyphosate is especially suitable for formulation according to the present invention. Thus for example the present invention provides formulations of glyphosate wherein the concentration of glyphosate salt (expressed as glyphosate acid) is greater than 240 g/l and more particularly greater than 300 g/l, for example about 330 g/l or more. The formulation of the present invention may contain both relatively high concentrations of glyphosate salt up to about 330 g/l or more glyphosate salt (expressed as glyphosate acid) and up to about 120 g/l or more of alkoxylated adjuvant.

Brief Summary Text (37):
The proportion of alkoxylated adjuvant in the formulation of the invention is preferably from 8 parts by weight alkoxylated adjuvant per 1 part by weight alkyl glycoside to 1 part by weight alkoxylated adjuvant per 8 parts by weight alkylglycoside, for example 5 parts by weight alkoxylated adjuvant per 1 part by weight alkyl glycoside to 1 part by weight alkoxylated adjuvant per 8 parts by weight alkylglycoside and most preferably from 1 part by weight alkoxylated adjuvant per 0.5 parts by weight alkylglycoside to 1 part by weight alkoxylated adjuvant to 8 parts by weight alkylglycoside. An especially preferred composition contains about equal proportions by weight of alkylglycoside and alkoxylated adjuvant.

Brief Summary Text (38):
The co-surfactant (component d) present in the formulation is preferably from 0.1 parts by weight to 1 part by weight per 1 part by weight of alkylglycoside and most preferably from 0.2 parts by weight to 0.8 parts by weight of co-surfactant per 1 part by weight of alkyglycoside.

Brief Summary Text (39):
The proportion of additional ionic surfactant (component e) is preferably from 0 to 1 part by weight per 1 part by weight alkylglycoside and most preferably from 0.1 parts by weight to 0.3 parts by weight ionic surfactant per 1 part alkylglycoside.

Brief Summary Text (40):
The proportion by weight of the total adjuvant system (alkyl polyglycoside, alkoxylated adjuvant and ionic surfactant, if used) to the agrochemical electrolyte is preferably from 2:1 to 1:5 and especially from 1:1 to 1:4.

Brief Summary Text (42):
Compositions of the present invention provide adjuvant enhancement for the active agrochemical concerned or increase the effectiveness of the adjuvant if the agrochemical electrolyte is an agrochemical enhancer such as ammonium sulphate. Thus formulations of the invention wherein the agrochemical electrolyte is a herbicide, and in particular when the herbicide is glyphosate, are active against a broad range of weed species including monocotyledonous and dicotyledonous species.

Brief Summary Text (46):
We have found that the development of a structured aqueous phase and a homogeneous dispersion which gives a uniform distribution in respect of all the components within the formulation, is not crucially dependent on the method of preparation of the formulation. Typically, the agrochemical electrolyte is dissolved in the desired quantity of water and the alkylglycoside and alkoxylated adjuvant are added with warming and

Brief Summary Text (48):
Thus according to a further aspect of the present invention there is provided a process for the preparation of a composition according to the present invention wherein the agrochemical electrolyte, the alkylglycoside and the alkoxylated adjuvant are dissolved or dispersed in water with the further ionic surfactant, if used, and thereafter the co-surfactant is added and interacts with the alkylglycoside to form a structured system.

Detailed Description Text (3):
The trimethylsulphonium salt of glyphosate (component a), alkylglycoside (component c - AGRIMUL PG2067) and water were combined to form a solution. This solution was warmed to about 40.degree. C. whilst stirring at 300-500 rpm with a Heidolp PZ R50 mixer, typically fitted with a four bladed stirrer. A non-ionic ethoxylated adjuvant (component b), which was warmed until fluid, was added and the mixture stirred for five minutes, after which the heating was discontinued. A cationic surfactant (component e) was then added and mixed for about five minutes. Finally an alcohol (component d) was added and stirred for fifteen minutes with the stirrer speed increased to 500-750 rpm. The sample was left to stand at room temperature to cool.

Detailed Description Text (12):
The following all formed clear or slightly turbid formulations with no visible sign of inhomogeneous phase separation after storage at 25.degree. C. for three months. Examples 18 and 19 illustrate the use of pentanol and oleyl alcohol respectively as the co-surfactant. Examples 20 to 22 illustrate the use of alternative alkoxylated adjuvants. Examples 23 to 25 illustrate the use of alternative alkylglycosides.

Detailed Description Text (14):
Paraquat dichloride containing magnesium sulphate hepta-hydrate (purgative) was formulated according to the present invention as shown below and was stored for 3 months at 25.degree. C. and 40.degree. C. respectively without any visible signs of separation. In contrast the corresponding composition containing no octanol separated within 5 days storage at 25.degree. C. and 40.degree. C. respectively.

Detailed Description Text (18):
The herbicidal activity of glyphosate compositions of the present invention was compared with that of a commercial glyphosate standard. The glyphosate trimesium compositions of Examples 6 to 10 were applied at 240 g/ha in 200 l/ha deionised water. Visual assessment of percentage herbicidal effect was made 25 days after treatment and compared with a commercial glyphosate standard applied at the same rate. The results are presented at mean % control over a range of standard grass species and over a range of standard broad-leaved weeds.

Detailed Description Paragraph Table (1):

	Example 1	Example 2
Glyphosate trimesium	480 g/l	480 g/l
AGRIMUL PG2067*	110 g/l	110 g/l
SYNPERONIC A16*	110 g/l	
SYNPERONIC A16		110 g/l
ARQUAD 16-29*	69 g/l	
ETHOMEEN T25*	20 g/l	
Octanol	50 g/l	60 g/l
Water to	1 liter	1 liter

*AGRIMUL PG2067 is a 70% w/w solution of alkylpolyglycoside of formula (I above wherein n is an average of 1.7 and R.sup.5 is a mixture of octyl (45%) and decyl (55%). AGRIMUL is a trademark of Henkel. SYNPERONIC A16 is a blend of the ethoxylated alcohol SYNPERONIC A11 which has a mean ethylene oxide content of 11 with SYNPERONIC A20 (which has a mean ethylene oxide content of 20) in the ratio 3 to 2. SYNPERONIC is a trademark of Imperial Chemical Industries. ARQUAD 1629 is a 29% by weight solution of hexadecyl trimethyl ammonium chloride in water. ARQUAD is a trademark of Akzo Nobel. ETHOMEEN T25 is an ethyoxylated tallowamine having 15 moles of ethylene oxide per mole of tallowamine.

ETHOMEEN is a trademark of Akzo Nobel.

Detailed Description Paragraph Table (2):

	Example 3	Example 4
	Glyphosate trimesium 480 g/l	Glyphosate trimesium 480 g/l
	AGRIMUL PG2067 110 g/l	AGRIMUL PG2067 110 g/l
	SYNPERONIC A16 110 g/l	SYNPERONIC A11 110 g/l
	ETHOMEEN C25 20 g/l	ARQUAD 16-29 69 g/l
	Octanol 60 g/l	2-Ethylhexanol 60 g/l
	Water to 1 liter	Water to 1 liter

	Example 5	Example 6
	Glyphosate trimesium 480 g/l	Glyphosate trimesium 480 g/l
	AGRIMUL PG2067 110 g/l	AGRIMUL PG2067 110 g/l
	SYNPERONIC A16 110 g/l	SYNPERONIC A16 110 g/l
	ARQUAD C35* 57 g/l	ARQUAD 16-29 69 g/l
	2-Ethylhexanol 50 g/l	2-Ethylhexanol 60 g/l
	Water to 1 liter	Water to 1 liter

*ARQUAD C35 is a 35% by weight solution of cocotrimethylammonium chloride in water.

Detailed Description Paragraph Table (3):

	Example 7	Example 8
	Glyphosate trimesium 480 g/l	Glyphosate trimesium 480 g/l
	AGRIMUL PG2067 110 g/l	AGRIMUL PG2067 110 g/l
	RHODASURF TR/15* 110 g/l	RHODASURF TR/15* 110 g/l
	ARQUAD 16-29 69 g/l	ARQUAD 16-29 69 g/l
	Octanol 60 g/l	2-Ethylhexanol 60 g/l
	Water to 1 liter	Water to 1 liter

*RHODASURF TR/15 is a polyoxyethylene tridecylalcohol having a mean degre of ethoxylation of 15. RHODASURF is a trademark of Rhone Poulenc.

Detailed Description Paragraph Table (4):

	Example 9	Example 10
	Glyphosate trimesium 480 g/l	Glyphosate trimesium 480 g/l
	AGRIMUL PG2067 110 g/l	AGRIMUL PG2067 115 g/l
	MERGITAL LM17* 110 g/l	MERGITAL LM11* 115 g/l
	ETHOQUAD C12* 27 g/l	ARQUAD 16-29 34 g/l
	2-Ethylhexanol 60 g/l	2-Ethylhexanol 50 g/l
	Water to 1 liter	Water to 1 liter

*ETHOQUAD C12 is a 75% by weight solution in 2propanol of ethoxylated coc methyl ammonium chloride having a degree of ethoxylation of 2. ETHOQUAD i a trademark of Akzo Nobel. MERGITAL LM17 is an ethoxylated C.sub.12 -C.sub.16 alcohol having a mean degree of ethoxylation of 17. MERGITAL is a trademark of Sidobre Sinnova. MERGITAL LM11 is ethoxylated C.sub.12 -C.sub.16 alcohol having a mean degree of ethoxylation of 11.

Detailed Description Paragraph Table (5):

	Example 11	Example 12
	Glyphosate trimesium 480 g/l	Glyphosate trimesium 480 g/l
	AGRIMUL PG2067 110 g/l	AGRIMUL PG2067 110 g/l
	SYNPERONIC A11 110 g/l	SYNPERONIC L2* 60 g/l
	TERGITOL 15-S-9* 100 g/l	2-Ethylhexanol 60 g/l
	ARQUAD 16-29 69 g/l	Water to 1 liter
	ARQUAD 16-29 69 g/l	
	SYNPERONIC L2* 60 g/l	
	2-Ethylhexanol 60 g/l	
	Water to 1 liter	

*SYNPERONIC L2 is an ethoxylated lauryl alcohol having a mean degree of ethoxylation of 2. TERGITOL 15S-9 is an ethoxylated secondary alcohol having a mean degree o ethoxylation of 9. TERGITOL is a trademark of Union Carbide.

Detailed Description Paragraph Table (6):

	Example 13	Example 14
	Glyphosate trimesium 480 g/l	Glyphosate trimesium 480 g/l
	AGRIMUL PG2067 110 g/l	AGRIMUL PG2067 110 g/l
	SURFYNOL 465* 100 g/l	SYNPERONIC PE P85* 100 g/l
	ARQUAD 16-29 69 g/l	ARQUAD 16-29 69 g/l
	2-Ethylhexanol 60 g/l	2-Ethylhexanol 60 g/l
	Water to 1 liter	Water to 1 liter

*SURFYNOL 465 is an ethoxylated acetylenic diol with a mean degree of ethoxylation of 10. SURFYNOL is a trademark of Air Products. SYNPERONIC PE P85 is a block copolymer of ethylene oxide and propylene oxide with a molecular weight of 4650 and containing 50 weight % ethylene oxide.

Detailed Description Paragraph Table (7):

	Example 15	Example 16
	Glyphosate trimesium 480 g/l	Glyphosate trimesium 480 g/l
	AGRIMUL PG 2067 110 g/l	AGRIMUL PG2067 110 g/l
	SYNPERONIC A11 110	

g/l CITHROL 6ML* 110 g/l ARQUAD 16-29 69 g/l ARQUAD 16-29 69 g/l CITHROL GML* 60 g/l 2-Ethylhexanol 60 g/l Water to 1 liter Water to 1 liter

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Detailed Description Paragraph Table (9):

Example 17

Glyphosate trimesium 480 g/l AGRIMUL PG2067 150 g/l SYNPERONIC A16 120 g/l Octanol 75 g/l Water to 1 liter

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Detailed Description Paragraph Table (10):

Example 18 Example 19

Glyphosate trimesium 480 g/l Glyphosate trimesium 480 g/l AGRIMUL PG2067 110 g/l AGRIMUL PG2067 110 g/l SYNPERONIC A11 110 g/l SYNPERONIC A11 110 g/l ARQUAD 16-29 69 g/l ARQUAD 16-29 69 g/l Pentanol 60 g/l Oleyl alcohol 60 g/l Water to 1 liter Water to 1 liter

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Example 20 Example 21

Glyphosate trimesium 480 g/l Glyphosate trimesium 480 g/l AGRIMUL PG2067 110 g/l AGRIMUL PG2067 110 g/l SILWET L77 30 g/l TWEEN 20 60 g/l ARQUAD 16-29 69 g/l ARQUAD 16-29 69 g/l 2-ethylhexanol 60 g/l 2-ethylhexanol 60 g/l Water to 1 liter Water to 1 liter

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Example 22 Example 23

Glyphosate trimesium 480 g/l Glyphosate trimesium 480 g/l AGRIMUL PG2067 110 g/l BEROL AG6202 100 g/l SYNPERONIC NP13 60 g/l SYNPERONIC A11 100 g/l ARQUAD 16-29 69 g/l ETHOMEEN C12 40 g/l 2-ethylhexanol 60 g/l Decanol 40 g/l Water to 1 liter Water to 1 liter

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Example 24 Example 25

Glyphosate trimesium 480 g/l Glyphosate trimesium 480 g/l AGRIMUL PG2069 150 g/l AL2042 129 g/l SYNPERONIC A11 80 g/l SYNPERONIC A16 120 g/l ETHOQUAD C12 27 g/l Octanol 60 g/l Decanol 60 g/l Water to 1 liter Water to 1 liter

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Detailed Description Paragraph Table (11):

Paraquat dichloride 276 g/l Magnesium sulphate 100 g/l AGRIMUL PG2067 110 g/l SYNPERONIC PE L44 125 g/l ETHOQUAD C12 27 g/l Octanol 40 g/l Water to 1 liter

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Detailed Description Paragraph Table (12):

Example 27 Example 28

Glyphosate trimesium 480 g/l Glyphosate trimesium 480 g/l AGRIMUL PG2067 110 g/l AGRIMUL PG2067 110 g/l SYNPERONIC A11 110 g/l SYNPERONIC A11 110 g/l ARQUAD 16-29 69 g/l ARQUAD 16-29 69 g/l SYNPERONIC OP3 60 g/l SPAN 20 50 g/l Water to 1 liter Water to 1 liter

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Current US Original Classification (1):
504/206

Current US Cross Reference Classification (2):
504/250

CLAIMS:

1. An aqueous agrochemical concentrate formulation comprising

a) an agrochemical electrolyte,

b) an alkoxylated adjuvant,

c) an alkylglycoside, and

d) a co-surfactant which interacts with the alkylglycoside to form a structured aqueous system,

wherein the co-surfactant (d) is

i) a linear or branched chain aliphatic or aromatic alcohol, or

ii) an alcohol or ester or alkyl phenol alkoxylate which is an alkoxylated C.sub.8 -C.sub.22 alcohol, an alkoxylated C.sub.8 -C.sub.22 alkyl phenol or an alkoxylated C.sub.8 -C.sub.22 carboxylic acid each containing from 1-3 alkoxy groups provided that the alkoxylated adjuvant (b) contains from 6 to 50 C.sub.1 -C.sub.4 alkoxy groups, or

iii) a glyceryl, alkyl or alkenyl ester,

provided that the concentration of the agrochemical electrolyte is such that the alkoxylated adjuvant would normally undergo uncceptable phase separation in the absence of the co-surfactant which interacts with the alkylglycoside to form a structured aqueous system.

4. A concentrate according to claim 1 wherein the agrochemical electrolyte is selected from salts of glyphosate, fomesafen, glufosinate, paraquat and bentazone.

7. A concentrate according to claim 1 wherein the composition additionally contains a cationic surfactant having at least one linear or branched long chain alkyl or alkenyl or alkyl aryl substituent containing from 8 to 20 alkyl or alkenyl carbon atoms and a mean ethylene oxide content of from 0 to 20 which is an optionally ethoxylated amine, quaternary ammonium salt or amine oxide or wherein the composition additionally contains an anionic surfactant having at least one long chain alkyl or alkenyl substituent containing from 8 to 20 carbon atoms which is an alkyl sulphate, alkyl carboxylate, alkyl sulphosuccinate, alkyl phosphate or alkylbenzene sulphonate and derivatives thereof.

8. A concentrate according to claim 7 wherein the proportion of additional ionic surfactant is from 0 parts by weight to 1 parts by weight ionic surfactant per 1 part alkylglycoside.

9. A concentrate according to claim 7 wherein the proportion by weight of the total of the alkylglycoside, alkoxylated adjuvant and additional ionic surfactant, if used, to the agrochemical electrolyte is from 2:1 to 1:5.

10. A concentrate according to claim 1 wherein the proportion of the alkoxylated adjuvant is from 8 parts by weight alkoxylated adjuvant per 1 part by weight alkyl glycoside to 1 part by weight alkoxylated adjuvant per 8 parts by weight alkylglycoside.

11. A concentrate according to claim 1 wherein the proportion of the co-surfactant is preferably from 0.1 parts by weight to 1 part by weight per 1 part by weight of alkylglycoside.

13. A process for the preparation of a composition according to claim 7 wherein the agrochemical electrolyte, the alkylglycoside and the alkoxylated adjuvant are dissolved or dispersed in water with the further ionic surfactant, if used, and thereafter the co-surfactant is added and interacts with the alkylglycoside to form a structured system.

L26: Entry 18 of 20 File: USPT Jan 4, 2000

DOCUMENT-IDENTIFIER: US 6010979 A
TITLE: Herbicidal composition

Brief Summary Text (1):
This invention relates to a herbicidal composition and in particular to a glyphosate composition.

Brief Summary Text (2):
The term "glyphosate composition" is used herein to mean a herbicidal composition comprising an active ingredient N-phosphonomethylglycine or a herbicidally acceptable salt thereof.

Brief Summary Text (3):
Herbicidally active glyphosate compositions are well known and are commercially available in the form of the trimethylsulphonium, isopropylamine and other salts. Such compositions are generally applied to unwanted vegetation in the form of an aqueous formulation containing a variety of adjuvants including for example wetters or other surface-active agents, anti-freeze agents, dyes, dispersants, rheological agents, anti-foam agents and humectants. The activity of the glyphosate composition may be improved considerably by the careful choice of additives. The literature contains many hundreds of examples of different glyphosate formulations exhibiting a variety of properties and designed for a variety of purposes.

Brief Summary Text (4):
Glyphosate compositions are very effective in killing unwanted weeds to which they are applied. However the uptake of the glyphosate composition by the plant leaf surface is relatively slow. In consequence the composition may be washed off the leaf surface and the herbicidal effectiveness may be reduced or even lost if rain falls shortly after application of the composition (for example within 6 hours of application). This is a particular problem for example in tropical climates in which it is difficult to predict the occurrence of heavy rain showers. Glyphosate compositions have been produced which are claimed to give improved rainfastness, but the topic is poorly understood and the physical parameters involved are highly complex and may vary from species to species. It may for example be appropriate to provide a composition which generally improves rainfastness for most species but is relatively ineffective on particular individual species. One approach which has been studied is to seek to improve the rate of uptake of the glyphosate composition into the leaf surface with a view to minimising the susceptibility to rain. Such improved uptake is often only achieved however at the expense of localised tissue damage and reduced translocation. It is clearly important that improved rainfastness is not associated with a significant reduction in herbicidal activity in the absence of rain. It is therefore desired to provide a glyphosate composition combining good activity in the absence of rain with effective rainfastness.

Brief Summary Text (5):
The present invention seeks to provide herbicidally effective compositions having improved rainfastness, by which is meant that compositions of the present invention generally reduce the overall loss in herbicidal effectiveness resulting from a fall of rain within for example from 1 to 6 hours after application of the composition. Compositions of the present invention may also show enhanced activity as compared with known glyphosate compositions and advantage as compared with known compositions may be found in either one or in both of these effects.

Brief Summary Text (6):
According to the present invention there is provided a glyphosate composition comprising (i) N-phosphonomethylglycine or an agriculturally acceptable salt thereof, (ii) a alkylglycoside surfactant of formula (I): ##STR1## wherein R.sup.1 represents a C1 to C8 alkyl group, the sum of w+x+y+z is from 4 to 40 and R.sup.2 is hydrogen or a C1 to C6 alkyl group or a group of formula --R.sup.3 --N.sup.(+) R.sup.4 R.sup.5 R.sup.6 X.sup.- wherein R.sup.3 is a C1 to C6 alkylene group optionally substituted with hydroxy, R.sup.4, R.sup.5 and R.sup.6 are each alkyl groups wherein the total number of carbon atoms in R.sup.4, R.sup.5 and R.sup.6 is from 6 to 25 and X.sup.- is an agrochemically acceptable anion and (iii) an ethoxylated alcohol.

Brief Summary Text (11):
As examples of suitable ethoxylated alkylglucosides which may be used in the present invention may be mentioned the compound available under the trade name GLUCAM E-10 and E-20 of structure (II) wherein w+x+y+z represents 10 for GLUCAM E-10 AND 20 FOR GLUCAM E-20, and the compound available under the trade name GLUCQUAT 125 having the structure (III) wherein w+x+y+z represents 10. The product GLUCQUAT 125 is a 25% by weight solution of the above compound in water. ##STR2##

Brief Summary Text (15):
The N-phosphonomethylglycine or agriculturally acceptable salt thereof is conveniently the trimethylsulphonium, isopropylamine, sodium, or ammonium salt, although N-phosphonomethylglycine itself or any agriculturally acceptable salt thereof is acceptable for incorporation in the composition of the present invention. It is preferred to use a water-soluble salt of N-phosphonomethylglycine.

Brief Summary Text (17):
Thus in one embodiment of the present invention there is provided an aqueous herbicidal concentrate which is sufficiently storage-stable for commercial use and which is diluted before use, usually with water. The term "herbicidal concentrate" covers a range of compositions from the relatively dilute which requires the addition of relatively little water to a more concentrated composition which has a high content of glyphosate and thus has advantages for handling and transportation. The preference for a concentrated glyphosate rainfast composition poses an additional problem which must be solved, since many adjuvants are incompatible with each other or with the active ingredient in concentrated compositions. By the term "concentrated" glyphosate composition is meant a composition having a concentration greater than 210 g/l for example greater than 220 g/l based on glyphosate acid. In the case of the trimethylsulphonium salt of glyphosate for example, this equates to a concentration of greater than 304 g/l and more particularly greater than about 319 g/l based on the salt.

Brief Summary Text (18):
In an alternative embodiment of the present invention the alkyl glucoside and the ethoxylated alcohol may be formulated together, optionally with other adjuvants such as an inorganic salt or one or more additional surfactants as described below, to form an adjuvant composition suitable for tank mixing with a glyphosate composition. The adjuvant composition is tank mixed prior to use, for example with a commercially available glyphosate composition. The glyphosate composition could be an aqueous formulation containing essentially only glyphosate or could itself contain suitable adjuvants.

Brief Summary Text (19):
Thus according to a further aspect of the present invention there is provided an adjuvant composition suitable for admixture with N-phosphonomethylglycine or an agriculturally acceptable salt thereof to form a composition according to the present invention which adjuvant composition comprises (i) an ethoxylated alkylglucoside surfactant and (ii) an ethoxylated alcohol and optionally (iii) an additional surfactant.

Brief Summary Text (20):
The proportion of ethoxylated alkylglucoside present in the herbicidal composition or in the adjuvant composition is preferably from 1 part by weight of ethoxylated

alkylglucoside per 5 parts ethoxylated alcohol to 8 parts by weight of ethoxylated alkylglucoside per 1 part ethoxylated alcohol and most preferably from 0.5 parts by weight of ethoxylated alkylglucoside per 1 part ethoxylated alcohol to 8 parts by weight ethoxylated alkylglucoside per 1 part ethoxylated alcohol for example from 1 part by weight ethoxylated alkylglucoside per 1 part by weight ethoxylated alcohol to 8 parts by weight ethoxylated alkylglucoside per 1 by weight part ethoxylated alcohol. An especially preferred composition contains about equal proportions by weight of ethoxylated alkylglucoside and ethoxylated alcohol.

Brief Summary Text (21):
If the composition contains a relatively high proportion of ethoxylated alcohol it may be desirable to add an additional surfactant to enhance stability, especially if the composition is used in the form of an aqueous concentrate. A wide range of suitable additional surfactants will occur to those skilled in the art and those which have been found to enhance stability include cationic or nonionic surfactants containing an amine, ammonium or amine oxide group for example quaternary tetra-alkyl ammonium salt surfactants such as hexadecyl trimethyl ammonium chloride and primary or quaternary ethoxylated long-chain alkyl amines such as coco-anine, hydrogenated tallow amine each having a mean ethylene oxide content of from 2 to 20 when ethoxylated. In some instances, the additional surfactant may even provide an increase in the activity of the composition. Thus especially preferred additional surfactants are optionally ethoxylated quaternary ammonium salts having at least one long chain substituent containing from 10 to 20 carbon atoms and mean ethylene oxide content of from 0 to 5. Examples of suitable additional surfactants include hexadecyl trimethyl ammonium chloride, trimethyl tallowammonium chloride, trimethyl cocoammonium chloride and N-methyl cocoammonium chloride having a mean ethylene oxide content of 2.

Brief Summary Text (22):
The proportion of additional surfactant is preferably from 0 to 2 parts by weight per 1 part by weight of ethoxylated alcohol and more preferably about 1 part by weight per 1 part by weight of ethoxylated alcohol. Thus an especially preferred composition comprises a total adjuvant system comprising substantially equal proportions by weight of ethoxylated alkylglucoside, ethoxylated alcohol and additional surfactant.

Brief Summary Text (23):
The proportion by weight of the total adjuvant system (ethoxylated alkylglucoside, ethoxylated alcohol and any additional surfactant used) to the glyphosate salt in a concentrate composition is preferably from 3:1 to 1:3 and especially from 1:1 to 1:3. A ratio of about 1:2 is especially preferred. Higher proportions of adjuvant system may be used if desired in a tank mix or ready to use composition.

Brief Summary Text (25):
Thus according to a further aspect of the present invention there is provided a glyphosate composition comprising (i) N-phosphonomethylglycine or an agriculturally acceptable salt thereof, (ii) an ethoxylated alkylglucoside surfactant, (iii) an ethoxylated linear or branched chain alcohol and (iv) a humectant.

Brief Summary Text (27):
The humectant is most conveniently used in a tank mix composition or in a ready to use composition. The proportion is preferably from 1 part of glyphosate salt per 1 part humectant to 1 part glyphosate salt per 20 parts humectant.

Brief Summary Text (28):
The composition of the present invention may additionally include an inorganic ammonium salt such as ammonium sulphate as an activity-enhancing adjuvant. The proportion of ammonium sulphate (if used) is preferably from 1 part inorganic ammonium salt per 1 part glyphosate salt to 10 parts ammonium salt per 1 part glyphosate salt. The ammonium salt is most conveniently used in a tank mix composition or in a ready to use composition.

Brief Summary Text (31):
Compositions of the present invention include both solid compositions, dilute compositions, which are ready for immediate use, and concentrated compositions,

which require to be diluted before use, usually with water. Preferably the compositions contain from 0.01% to 90% by weight of the agriculturally acceptable salt of N-phosphonomethylglycine. Dilute compositions ready for use preferably contain from 0.01 to 2% of agriculturally acceptable salt of N-phosphonomethylglycine, while concentrated compositions may contain from 20 to 90% of agriculturally acceptable salt of N-phosphonomethylglycine, although from 20 to 70% is usually preferred.

Brief Summary Text (33):
Liquid compositions may comprise a solution, suspension or dispersion of the active ingredients in water optionally containing a surface-active agent, or may comprise a solution or dispersion of the active ingredient in a water-immiscible organic solvent which is dispersed as droplets in water. Preferred active ingredients of the composition of the present invention are water-soluble herbicides or are readily suspended in water and it is preferred to use aqueous compositions and concentrates. In particular, the trimethylsulphonium, isopropylamine, sodium and ammonium salts of glyphosate are all readily soluble in water.

Brief Summary Text (36):
The compositions for use in the form of aqueous solutions or dispersions are generally supplied in the form of a concentrate containing a high proportion of the active ingredients, and the concentrate is then diluted with water before use. The concentrates are usually required to withstand storage for prolonged periods and after such storage, to be capable of dilution with water to form aqueous preparations which remain homogeneous for a sufficient time to enable them to be applied by conventional spray equipment. Concentrates conveniently contain 20-70%, preferably 20-50%, by weight of the agriculturally acceptable salt of N-phosphonomethylglycine. Dilute preparations ready for use may contain varying amounts of the agriculturally acceptable salt of N-phosphonomethylglycine depending upon the intended purpose; amounts of 0.01% to 10.0% and preferably 0.1% to 2%, by weight of agriculturally acceptable salt of N-phosphonomethylglycine are normally used.

Brief Summary Text (40):
The other herbicide may be any herbicide other than a glyphosate salt. It will generally be a herbicide having a complementary action in the particular application.

Brief Summary Text (59):
R. diphenylether herbicides such as lactofen, fluroglycofen or salts or ester thereof, nitrofen, bifenox, aciflurofen and salts and esters thereof, oxyfluorfen, fomesafen, chlornitrofen and chlomethoxyfen;

Brief Summary Text (70):
bipyridylium herbicides such as those in which the active entity is paraquat and those in which the active entity is diquat;

Detailed Description Text (3):
A tank-mixed adjuvant system at a concentration of 0.25% w/v was added to aqueous solutions of the trimethylsulphonium salt of N-phosphonomethylglycine at four doses of 125 g/ha, 250 g/ha, 500 g/ha and 1000 g/ha respectively. Activity (damage to plants) was assessed a given number of days after treatment (depending on species, see Table I)) by comparison with untreated plants on a 0-100% scale, where 0% is no damage and 100% is complete kill. The rate required for 90% control (ED 90) against a given species was calculated from these data. It should be noted that the smaller the value of the ED 90 figure, the more active is the composition.

Detailed Description Text (4):
The adjuvant system contained equal parts by weight of an ethoxylated alkylglucoside of formula (III) above (commercially available as a 25% solution under the trademark GLUCQUAT 125) and a mixture of ethoxylated branched linear C.sub.13 -C.sub.15 alcohols having ethylene oxide contents of 11 and 20 respectively (SYNPERONIC A11 and SYNPERONIC A20 in the ratio of 60 to 40) giving an overall mean ethylene oxide content of about 15. The ED 90 Data is given in Table 2 below.

Detailed Description Text (8):
The procedure of Example 1 was repeated using 0.25% w/v tank-mixed adjuvant system containing equal weights of SYNPERONIC A16 and the ethoxylated alkylglucoside of formula (ii) commercially available as GLUCAN E-20 at a strength of 10% w/w. The ED 90 values are presented in Table 2.

Detailed Description Text (13):
To an aqueous solution containing 720 g/l of the trimethylsulphonium salt of N-phosphonomethylglycine was added 0.125% on a volume per volume basis of SYNPERONIC A16 and 0.125% on a volume per volume basis of the active component of GLUCQUAT 125.

Detailed Description Text (14):
Corresponding comparison concentrates were prepared in which the adjuvant system containing both GLUCQUAT 125 and SYNPERONIC A16 was replaced by (a) 0.25% on a volume per volume basis of only GLUCQUAT 125 (Comparison 2) (b) by 0.25% on a volume per volume basis of only SYNPERONIC A16 (Comparison 3) and (c) 0.25% on a volume by volume basis of a conventional alkylpolyglycoside surfactant commercially available from Imperial Chemical Industries as AL2042 (Comparison 4)

Current US Original Classification (1):
504/206

CLAIMS:

1. A glyphosate composition comprising (i) N-phosphonomethylglycine or an agriculturally acceptable salt thereof, (ii) a alkylglycoside surfactant of formula (I) ##STR3## wherein R.sup.1 represents a C1 to C8 alkyl group, the sum of w+x+y+z is from 4 to 40 and R.sup.2 is hydrogen or a C1 to C6 alkyl group or a group of formula --R.sup.3 --N.sup.(+) R.sup.4 R.sup.5 R.sup.6 X.sup.- wherein R.sup.3 is a C1 to C6 alkylene group optionally substituted with hydroxy, R.sup.4, R.sup.5 and R.sup.6 are each alkyl groups wherein the total number of carbon atoms in R.sup.4, R.sup.5 and R.sup.6 is from 6 to 25 and X.sup.- is an agrochemically acceptable anion and (iii) an ethoxylated alcohol.

7. A composition according to claim 1 wherein the proportion of alkylglycoside is from 1 part by weight of alkylglycoside per 5 parts by weight of ethoxylated alcohol to 8 parts by weight of alkylglycoside per 1 part by weight of ethoxylated alcohol.

8. A composition according to claim 7 wherein the proportion of alkylglycoside is from 0.5 parts by weight of alkylglycoside per 1 part by weight of ethoxylated alcohol to 8 parts by weight of alkylglycoside per 1 part by weight of ethoxylated alcohol.

9. A composition according to claim 1 which is a herbicidal concentrate wherein there is used a water-soluble salt of N-phosphonomethylglycine and the concentration of the N-phosphonomethylglycine salt is greater than 210 g/l based on glyphosate acid.

10. A composition according to claim 1 wherein the proportion by weight of the total adjuvant system, being the alkylglycoside, ethoxylated alcohol and additional surfactant, if used, to the N-phosphonomethylglycine or the agriculturally acceptable salt thereof is from 3:1 to 1:3.

End of Result Set

L26: Entry 20 of 20 File: USPT Mar 30, 1999

DOCUMENT-IDENTIFIER: US 5888934 A
TITLE: Herbicidal compositions and adjuvant composition comprising alkylpolyglycoside and ethoxylated alcohol surfactants

Abstract Text (1):
A glyphosate composition comprises (I) N-phosphonomethylglycine or an agriculturally acceptable salt thereof, (ii) an alkyl polyglycoside surfactant, (iii) an ethoxylated alcohol, for example an ethoxylated alcohol obtained by ethoxylation of a linear or branched chain aliphatic mono alcohol having a chain length of from 8 to 20 carbon atoms and a mean degree of ethoxylation of from 2 to 50 moles of ethylene oxide per mole of alcohol, and optionally (iv) an additional surfactant, and optionally (v) a humectant.

Brief Summary Text (1):
This invention relates to a herbicidal composition and in particular to a glyphosate composition.

Brief Summary Text (2):
The term "glyphosate composition" is used herein to mean a herbicidal composition comprising as active ingredient N-phosphonomethylglycine or a herbicidally acceptable salt thereof.

Brief Summary Text (3):
Herbicidally active glyphosate compositions are well known and are commercially available in the form of the trimethylsulphonium, isopropylamine and other salts. Such compositions are generally applied to unwanted vegetation in the form of an aqueous formulation containing a variety of adjuvants including for example wetters or other surface-active agents, anti-freeze agents, dyes, dispersants, Theological agents, anti-foam agents and humectants. The activity of the glyphosate composition may be improved considerably by the careful choice of additives. The literature contains many hundreds of examples of different glyphosate formulations exhibiting a variety of properties and designed for a variety of purposes.

Brief Summary Text (4):
In EP 0531269 for example there is disclosed a herbicidal composition comprising glyphosate or an agriculturally acceptable salt thereof and an acetylenic diol surfactant structurally characterized by a symmetrically substitued triple bond and adjacent hydroxyl groups or adjacent polymeric oxalkylated units, and optionally a second surfactant.

Brief Summary Text (5):
In EP 0526443 there is disclosed a compostion comprising a glyphosate herbicide, and activity ehnhancing alkylpolyglycoside and a foam moderating acetylenic diol.

Brief Summary Text (6):
Glyphosate compositions are very effective in killing unwanted weeds to which they are applied. However the uptake of the glyphosate composition by the plant leaf surface is relatively slow. In consequence the composition may be washed off the leaf surface and the herbicidal effectiveness may be reduced or even lost if rain falls shortly after application of the composition (for example within 6 hours of application). This is a particular problem for example in tropical climates in which

it is difficult to predict the occurrence of heavy rain showers. Glyphosate compositions have been produced which are claimed to give improved rainfastness, but the topic is poorly understood and the physical parameters involved are highly complex and may vary from species to species. It may for example be appropriate to provide a composition which generally improves rainfastness for most species but is relatively ineffective on particular individual species. One approach which has been studied is to seek to improve the rate of uptake of the glyphosate composition into the leaf surface with a view to minimising the susceptibility to rain. Such improved uptake is often only achieved however at the expense of localised tissue damage and reduced translocation. It is clearly important that improved rainfastness is not associated with a significant reduction in herbicidal activity in the absence of rain. It is therefore desired to provide a glyphosate composition combining good activity in the absence of rain with effective rainfastness.

Brief Summary Text (7):
The present invention seeks to provide herbicidally effective compositions having improved rainfastness, by which is meant that compositions of the present invention generally reduce the overall loss in herbicidal effectiveness resulting from a fall of rain within for example from 1 to 6 hours after application of the composition. Compositions of the present invention may also show enhanced activity as compared with known glyphosate compositions and advantage as compared with known compositions may be found in either one or in both of these effects.

Brief Summary Text (8):
According to the present invention there is provided a glyphosate composition comprising (i) N-phosphonomethylglycine or an agriculturally acceptable salt thereof, (ii) a alkylpolyglycoside surfactant and (iii) an ethoxylated alcohol wherein the ethoxylated alcohol is obtained by ethoxylation of a linear or branched chain aliphatic mono alcohol having a chain length of from 8 to 20 carbon atoms and has a mean degree of ethoxylation of from 2 to 50 moles of ethylene oxide per mole of alcohol.

Brief Summary Text (9):
The alkylpolyglycoside for use in the present invention may be obtained by the reaction of alkanols with glucose or other mono- or di- or polysaccharides. As used herein the term "alkylpolyglycoside" includes an alkylmonoglycoside. Preferred alkylpolyglycosides for use in the present invention are alkylpolyglucosides obtained by the reaction of glucose with a straight or branched chain alkanol or mixture of alkanols, for example a mixture of alkanols containing 7 to 18, preferably 7 to 16 carbon atoms for example 8 to 10 carbon atoms. The number of glycose groups per alkyl group in the molecule may vary and alkyl mono- or di- or polyglucose or saccharide derivatives are possible. Commercial alkylpolyglucosides usually contain a mixture of derivatives having an average number of glycose groups per alkyl group (degree of polymerisation) of between 1 and 4, for example from about 1 to 2. A number of suitable alkylpolyglycosides are commercially available and include for example AL2042 (ICI); AGRIMUL 2069 (Henkel) and ATPLUS 258 (ICI). Saccharide-based surfactants which may be used include derivatives of mono-, di- or polysaccharides, including for example fatty acid esters of mono-, di- or polysaccharides. Such surfactants are commercially available for example under the trade mark CRODESTA (Croda).

Brief Summary Text (13):
The N-phosphonomethylglycine or agriculturally acceptable salt thereof is conveniently the trimethylsulphonium, isopropylamine, sodium, or ammonium salt, although N-phosphonomethylglycine itself or any agriculturally acceptable salt thereof is acceptable for incorporation in the composition of the present invention. It is preferred to use a water-soluble salt of N-phosphonomethylglycine.

Brief Summary Text (15):
Thus in one embodiment of the present invention there is provided an aqueous herbicidal concentrate which is sufficiently storage-stable for commercial use and which is diluted before use, usually with water. The term "herbicidal concentrate" covers a range of compositions from the relatively dilute which requires the addition of relatively little water to a more concentrated composition which has a high content of glyphosate and thus has advantages for handling and transportation.

The preference for a concentrated glyphosate rainfast composition poses an additional problem which must be solved, since many adjuvants are incompatible with each other or with the active ingredient in concentrated compositions. By the term "concentrated" glyphosate composition is meant a composition having a concentration greater than 210 g/l for example greater than 220 g/l based on glyphosate acid. In the case for the trimethylsulphonium salt of glyphosate for example, this equates to a concentration of greater 304 g/l and more particularly greater than about 319 g/l based on the salt.

Brief Summary Text (16):
In an alternative embodiment of the present invention the alkyl polyglycoside and the ethoxylated alcohol may be formulated together, optionally with other adjuvants such as an inorganic salt or one or more additional surfactants as described below, to form an adjuvant composition suitable for tank mixing with a glyphosate composition. The adjuvant composition is tank mixed prior to use, for example with a commercially available glyphosate composition. The glyphosate composition could be an aqueous formulation containing essentially only glyphosate or could itself contain suitable adjuvants.

Brief Summary Text (17):
Thus according to a further aspect of the present invention there is provided an adjuvant composition suitable for admixture with N-phosphonomethylglycine or an agriculturally acceptable salt thereof to form a composition according to the present invention, which adjuvant composition comprises (i) a alkylpolyglycoside surfactant and (ii) an ethoxylated alcohol wherein the ethoxylated alcohol is obtained by ethoxylation of a linear or branched chain aliphatic mono alcohol having a chain length of from 8 to 20 carbon atoms and has a mean degree of ethoxylation of from 2 to 50 moles of ethylene oxide per mole of alcohol and optionally (iii) an additional surfactant.

Brief Summary Text (18):
The proportion of alkylpolyglycoside present in the herbicidal composition or in the adjuvant composition is preferably from 1 part by weight alkylpolyglycoside per 5 parts by weight ethoxylated alcohol to 8 parts by weight alkylpolyglycoside per 1 part by weight ethoxylated alcohol and most preferably from 0.5 parts by weight alkylpolyglycoside per 1 part by weight ethoxylated alcohol to 8 parts by weight alkylpolyglycoside per 1 by weight part ethoxylated alcohol for example from 1 part by weight alkylpolyglycoside per 1 part by weight ethoxylated alcohol to 8 parts by weight alkylpolyglycoside per 1 by weight part ethoxylated alcohol. An especially preferred composition contains about equal proportions by weight of alkylpolyglycoside and ethoxylated alcohol.

Brief Summary Text (19):
If the composition contains a relatively high proportion of ethoxylated alcohol it may be desirable to add an additional surfactant to enhance stability, especially if the composition is used in the form of an aqueous concentrate. A wide range of suitable additional surfactants will occur to those skilled in the art and those which have been found to enhance stability include cationic or nonionic surfactants containing an amine, ammonium or amine oxide group for example quaternary tetra-alkyl ammonium salt surfactants such as hexadecyl trimethyl ammonium chloride; and primary, secondary or quaternary optionally ethoxylated long-chain alkyl amines such as coco-amine or hydrogenated tallow amine each having a mean ethylene oxide content of from 2 to 20 when ethoxylated. In some instances, the additional surfactant may even provide an increase in the activity of the composition. Thus especially preferred additional surfactants are optionally ethoxylated quaternary ammonium salts having at least one long chain substituent containing from 10 to 20 carbon atoms and mean ethylene oxide content of from 0 to 5. Examples of suitable additional surfactants include hexadecyl trimethyl ammonium chloride, trimethyl tallowammonium chloride, trimethyl cocoammonium chloride and N-methyl cocoammonium chloride having a mean ethylene oxide content of 2. It has been found that the presence of a mean ethylene oxide content of from about 1 to 5, for example about 2 provides an enhanced low-temperature stability for the formulation.

Brief Summary Text (20):
Thus according to a still further aspect of the present invention there is provided

an adjuvant composition suitable for admixture with N-phosphonomethylglycine or an agriculturally acceptable salt thereof, which composition comprises (i) a alkylpolyglycoside surfactant (ii) an ethoxylated alcohol wherein the ethoxylated alcohol is obtained by ethoxylation of a linear or branched chain aliphatic mono alcohol having a chain length of from 8 to 20 carbon atoms and has a mean degree of ethoxylation of from 2 to 50 moles of ethylene oxide per mole of alcohol and (iii) an optionally ethoxylated quaternary ammonium salt having at least one long-chain substituent containing from 10 to 20 carbon atoms and a mean ethylene oxide content of from 0 to 5.

Brief Summary Text (21):
The proportion of additional surfactant is preferably from 0 to 2 parts by weight per 1 part by weight of ethoxylated alcohol and more preferably about 1 part by weight per 1 part by weight of ethoxylated alcohol. Thus an especially preferred composition comprises a total adjuvant system comprising substantially equal proportions by weight of alkylpolyglycoside, ethoxylated alcohol and additional surfactant.

Brief Summary Text (22):
Compositions containing glyphosate, alkylpolyglycoside, ethoxylated alcohol and preferred additional surfactants have been found to classified as having only low skin and eye irritancy, and this provides a further commercial advantage.

Brief Summary Text (23):
The proportion by weight of the total adjuvant system (alkylpolyglycoside, ethoxylated alcohol and any additional surfactant used) to the glyphosate salt in a concentrate composition is preferably from 3:1 to 1:3 and especially from 1:1 to 1:3. A ratio of about 1:2 is especially preferred. Higher proportions of adjuvant system may be used if desired in a tank mix or ready to use composition.

Brief Summary Text (25):
Thus according to a further aspect of the present invention there is provided a glyphosate composition comprising (i) N-phosphonomethylglycine or an agriculturally acceptable salt thereof, (ii) a alkylpolyglycoside surfactant wherein the ethoxylated alcohol is obtained by ethoxylation of a linear or branched chain aliphatic mono alcohol having a chain length of from 8 to 20 carbon atoms and has a mean degree of ethoxylation of from 2 to 50 moles of ethylene oxide per mole of alcohol, (iii) an ethoxylated linear or branched chain alcohol and (iv) a humectant.

Brief Summary Text (28):
Thus according to a further aspect of the present invention there is provided a glyphosate composition comprising (i) N-phosphonomethylglycine or an agriculturally acceptable salt thereof, (ii) a alkylpolyglycoside surfactant, (iii) an ethoxylated linear or branched chain alcohol and (iv) a humectant.

Brief Summary Text (30):
The humectant is most conveniently used in a tank mix composition or in a ready to use composition. The proportion is preferably from 1 part of glyphosate salt per 1 part humectant to 1 part glyphosate salt per 20 parts humectant.

Brief Summary Text (31):
The composition of the present invention may additionally include an inorganic ammonium salt such as ammonium sulphate as an activity-enhancing adjuvant. The proportion of ammonium sulphate (if used) is preferably from 1 part inorganic ammonium salt per 1 part glyphosate salt to 10 parts ammonium salt per 1 part glyphosate salt. The ammonium salt is most conveniently used in a tank mix composition or in a ready to use composition.

Brief Summary Text (33):
The humectant is most conveniently used in a tank mix composition or in a ready to use composition. The proportion is preferably from 1 part of glyphosate salt per 1 part humectant to 1 part glyphosate salt per 20 parts humectant.

Brief Summary Text (34):

The composition of the present invention may additionally include an inorganic ammonium salt such as ammonium sulphate as an activity-enhancing adjuvant. The proportion of ammonium sulphate (if used) is preferably from 1 part inorganic ammonium salt per 1 part glyphosate salt to 10 parts ammonium salt per 1 part glyphosate salt. The ammonium salt is most conveniently used in a tank mix composition or in a ready to use composition.

Brief Summary Text (37):
Compositions of the present invention include both solid compositions, dilute compositions, which are ready for immediate use, and concentrated compositions, which require to be diluted before use, usually with water.. Preferably the compositions contain from 0.01% to 90% by weight of the agriculturally acceptable salt of N-phosphonomethylglycine. Dilute compositions ready for use preferably contain from 0.01 to 2% of agriculturally acceptable salt of N-phosphonomethylglycine, while concentrated compositions may contain from 20 to 90% of agriculturally acceptable salt of N-phosphonomethylglycine, although from 20 to 70% is usually preferred.

Brief Summary Text (39):
Liquid compositions may comprise a solution, suspension or dispersion of the active ingredients in water optionally containing a surface-active agent, or may comprise a solution or dispersion of the active ingredient in a water-immiscible organic solvent which is dispersed as droplets in water. Preferred active ingredients of the composition of the present invention are water-soluble herbicides or are readily suspended in water and it is preferred to use aqueous compositions and concentrates. In particular, the trimethylsulphonium, isopropylamine, sodium and ammonium salts of glyphosate are all readily soluble in water.

Brief Summary Text (42):
The compositions for use in the form of aqueous solutions or dispersions are generally supplied in the form of a concentrate containing a high proportion of the active ingredients, and the concentrate is then diluted with water before use. The concentrates are usually required to withstand storage for prolonged periods and after such storage, to be capable of dilution with water to form aqueous preparations which remain homogeneous for a sufficient time to enable them to be applied by conventional spray equipment. Concentrates conveniently contain 20-70%, preferably 20-50%, by weight of the agriculturally acceptable salt of N-phosphonomethylglycine. Dilute preparations ready for use may contain varying amounts of the agriculturally acceptable salt of N-phosphonomethylglycine depending upon the intended purpose; amounts of 0.01% to 10.0% and preferably 0.1% to 2%, by weight of agriculturally acceptable salt of N-phosphonomethylglycine are normally used.

Brief Summary Text (46):
The other herbicide may be any herbicide other than a glyphosate salt. It will generally be a herbicide having a complementary action in the particular application.

Brief Summary Text (65):
R. diphenylether herbicides such as lactofen, fluroglycofen or salts or ester thereof, nitrofen, bifenox, aciflurofen and salts and esters thereof, oxyfluorfen, fomesafen, chlornitrofen and chlomethoxyfen;

Brief Summary Text (76):
bipyridylium herbicides such as those in which the active entity is paraquat and those in which the active entity is diquat;

Detailed Description Text (4):
To an aqueous solution of the trimethylsulphonium salt of N-phosphonomethylglycine was added a pre-mixed adjuvant system containing equal parts by weight of an alkylpolyglucoside commercially available under the trademark AL2042 and a mixture of ethoxylated branched/linear C.sub.13 -C.sub.15 alcohols having ethylene oxide contents of 11 and 20 respectively (SYNPERONIC A11 and SYNPERONIC A20 in the ratio of 60 to 40) giving an overall mean ethylene oxide content of about 15. It should be noted in this and subsequent Examples that ethoxylated alcohols supplied under the

trade mark SYNPERONIC and used herein are all linear C.sub.13 -C.sub.15 alcohols whose ethylene oxide content is indicated as the number after the suffix "A". The ratio of the trimethylsulphonium salt of N-phosphonomethylglycine to the adjuvant system was 2:1 by weight and the content of the trimethylsulphonium salt of N-phosphonomethylglycine in the concentrate was 271 g/kg. This composition is designated COMPOSITION 1 in Table 1 below.

Detailed Description Text (5):
A corresponding concentrate was prepared in which the adjuvant system contained AL2042, the mixture of SYNPERONIC A11 and A20 referred to above and a quaternary C.sub.16 trimethyl ammonium chloride (ARQUAD 16-50--ARQUAD is a trademark of Akzo) in the proportions 1:1:1. The ratio of the trimethylsulphonium salt of N-phosphonomethylglycine to the adjuvant system was 2:1 by weight and the content of the trimethylsulphonium salt of N-phosphonomethylglycine in the concentrate was 330 g/kg. This composition is designated COMPOSITION 2 in Table 1 below.

Detailed Description Text (7):
The concentrates of the present invention were compared with a corresponding concentrate in which the adjuvant system contained AL2042 only. The ratio of the trimethylsulphonium salt of N-phosphonomethylglycine to the adjuvant system was 2:1 by weight and the content of the trimethylsulphonium salt of N-phosphonomethylglycine in the concentrate was 480 g/l. This composition is designated Comparison 1 in Table 1 below. A further comparison was undertaken with the commercially available glyphosate herbicide ROUNDUP (ROUNDUP is a trademark of Monsanto Co). This composition is designated Comparison 2 in Table 1 below.

Detailed Description Text (8):
Required aliquots of each formulation or adjuvant system were diluted to provide an application corresponding to 500 g glyphosate salt per ha applied at a spray volume rate equivalent to 200 l/ha. This was sprayed in three replicates onto young pot plants. Half the plants from each treatment were then returned to warm or temperate glasshouse environments as appropriate for optimal growth. The remaining plants were first subjected to simulated rain one hour after the treatments were applied by uniformly spraying with water at a rate of 4 mm in 30 seconds. The plants were then returned to the glasshouse.

Detailed Description Text (11):
The procedure of Example 1 was repeated using an adjuvant system containing AL2042, and a mixture of SYNPERONIC A7 and SYNPERONIC A50. SYNPERONIC A7 has a mean ethylene oxide content of 7 and SYNPERONIC A50 has a mean ethylene oxide content of 50 and the two were mixed in the ratio 54:46. The ratio of AL2042 to the SYNPERONIC mixture was 1:1. The ratio of the trimethylsulphonium salt of N-phosphonomethylglycine to the adjuvant system was 2:1 by weight. This composition is designated COMPOSITION 1 in Table 3 below. COMPOSITION 1 was compared with the corresponding composition containing no ethoxylated alcohol component (COMPARISON 1).

Detailed Description Text (14):
The procedure of Example 1 was repeated using tank mixed compositions. Thus composition 1 contained the trimethylsulphonium salt of N-phosphonomethylglycine and an adjuvant system containing equal parts by weight of AL2042 and the mixture of SYNPERONIC A11 and A 20 referred to in Example 1. The ratio of the trimethylsulphonium salt of N-phosphonomethylglycine to the adjuvant system was 2:1 by weight. Composition 2 contained an adjuvant system having equal proportions of AL2042, the mixture of SYNPERONIC A11 and A20 and ARQUAD 16-50, the proportions of adjuvant system to the glyphosate salt being the same. A comparison was undertaken with the glyphosate salt containing the same proportion of an adjuvant system comprised only of AL2042.

Detailed Description Text (15):
All compositions were sprayed at a rate equivalent to 200 l/ha and 500 g glyphosate salt/ha. The procedure was the same as in Example 1 except that the damage was assessed at 23 days after treatment.

Detailed Description Text (19):
This Example illustrates the synergistic effect of the adjuvant system of the

present invention in respect of activity in the absence of rain. In each instance, the ajduvant system was added at a conentration of 0.25% w/v to a solution of the trimethylsulphonium salt of glyphosate.

Detailed Description Text (21):
Composition 1 trimethylsulphonium salt of glyphosate and an adjuvant system comprised of 1 part AL2042 and 1 part of a mixture of SYNPERONIC A11 and SYNPERONIC A20 mixed in the ratio of 60:40.

Detailed Description Text (22):
Composition 2 trimethylsulphonium salt of glyphosate and an adjuvant system comprised of 1 part AL2042 and 1 part of a mixture of RENEX 30 and SYNPERONIC A20 in the ratio 60:40.

Detailed Description Text (23):
Composition 3 trimethylsulphonium salt of glyphosate and an adjuvant system comprised of 7 parts AL2042 and 3 parts of a mixture of RENEX 30 and SYNPERONIC A20 in the ratio 60:40.

Detailed Description Text (24):
Comparison 1 trimethylsulphonium salt of glyphosate and an adjuvant system comprised only of AL2042.

Detailed Description Text (25):
Comparison 2 trimethylsulphonium salt of glyphosate and an adjuvant system comprised only of the mixture of SYNPERONIC ethoxylated alcohols referred to in Composition 1.

Detailed Description Text (26):
Comparison 3 trimethylsulphonium salt of glyphosate and an adjuvant system comprised only of the mixture of RENEX 30 and SYNPERONIC A20 in the ratio 60:40.

Detailed Description Text (27):
Required aliquots of each formulation or adjuvant system were diluted to provide an application corresponding to 125 g/ha of glyphosate salt for SETVI and SORHA and 250 g/ha of glyphosate salt for CHEAL and ABUTH. All compositions were applied at a spray volume rate equivalent to 200 l/ha. This was sprayed in three replicates onto young pot plants.

Detailed Description Text (31):
This Example illustrates the use in the present invention of a variety of ethoxylated alcohols. The results show that compositions of the present invention are in general at least as active in the absence of rain as corresponding composition without the ethoxylated alcohol and in most instances are actually more active. In each instance, the adjuvant system was added at a conentration of 0.25% w/v to a solution of the trimethylsulphonium salt of glyphosate.

Detailed Description Text (32):
Composition 1 trimethylsulphonium salt of glyphosate and an adjuvant system comprised of 1 part AL2042 and 1 part of a mixture of SYNPERONIC All and SYNPERONIC A20 mixed in the ratio of 60:40.

Detailed Description Text (33):
Composition 2 trimethylsulphonium salt of glyphosate and an adjuvant system comprised of 1 part AL2042 and 1 part of a mixture of SYNPERONIC A7 and SYNPERONIC A20 mixed in the ratio of 7:3.

Detailed Description Text (34):
Composition 3 trimethylsulphonium salt of glyphosate and an adjuvant system comprised of 1 part AL2042 and 1 part of a mixture of SYNPERONIC A2 and SYNPERONIC A20 mixed in the ratio of 12:88.

Detailed Description Text (35):
Composition 4 trimethylsulphonium salt of glyphosate and an adjuvant system comprised of 1 part AL2042 and 1 part of a mixture of SYNPERONIC A7 and SYNPERONIC

A50 mixed in the ratio of 54:46.

Detailed Description Text (36):
Composition 5 trimethylsulphonium salt of glyphosate and an adjuvant system comprised of 1 part AL2042 and 1 part of a linear C.sub.9-11 alcohol having an ethylene oxide content of 20.

Detailed Description Text (37):
Composition 6 trimethylsulphonium salt of glyphosate and an adjuvant system comprised of 1 part AL2042 and 1 part of SYNPERONIC A20.

Detailed Description Text (38):
Composition 7 trimethylsulphonium salt of glyphosate and an adjuvant system comprised of 1 part AL2042 and 1 part of a linear C.sub.13 alcohol having an ethylene oxide content of 15.

Detailed Description Text (39):
Composition 8 trimethylsulphonium salt of glyphosate and an adjuvant system comprised of 1 part AL2042 and 1 part of a linear C.sub.16-18 alcohol having an ethylene oxide content of 17.

Detailed Description Text (42):
This Example illustrates the further improvement in activity which may be obtained if a humectant is added to the composition of the present invention. In each instance, the adjuvant system was added at a conentration of 0.25% w/v to a solution of the trimethylsulphonium salt of glyphosate.

Detailed Description Text (43):
To a composition containing the trimethylsulphonium salt of glyphosate and an adjuvant system comprising a 1:1 mixture of AL2042 with a mixture of SYNPERONIC A11 and SYNPERONIC A20 in the ratio 60:40 was added humectant in the indicated proportion. The compositions were evaluated at 7 days after treatment using the method of Example 5 and the results are presented in Table 9.

Detailed Description Text (51):
Composition 12 remained homogeneous despite the absence of an additional surfactant but required a undesirably high proportion of the relatively expensive alkylpolyglycoside surfactant. Composition 11 was the most effective on a product basis.

Detailed Description Text (53):
The procedure of Example 1 was repeated using a composition (COMPOSITION 14) containing trimethylsulphonium salt of glyphosate (360 g/l based on salt); a mixture of SYNPERONIC A11 and SYNPERONIC A20 in the ratio 60:40 (60 g/l total); alkylpolyglycoside (AL2042- 60 g/l) and ARQUAD 16-50 (60 g/l based on the quaternary ammonium salt surfactant--ARQUAD 16-50 is a 50% solution of quaternary ammonium surfactant in isopropyl alcohol).

Detailed Description Text (55):
Compositions 14 and 15 were compared with a composition containing 480 g/l trimethylsulphonium salt of glyphosate and 240 g/l AL2042 (COMPARISON).

Detailed Description Text (56):
The compositions were applied as in Example 1 and the activity (at 25 days after treatment) of the compositions with and without rainwashing (at one hour after spraying) is given in Table 10. The activity was calculated from a series of experiments using different concentrations and is presented in terms of the rate of active ingredient (g/ha trimethylsulphonium salt of glyphosate) required to give 90% control of the indicated weed species (ED90). Thus the lower the ED90 value in Table 10, the more active the composition.

Detailed Description Text (60):
Adjuvant systems were prepared for tankmixing with the trimethylsulphonium salt of glyphosate as follows:

Detailed Description Text (62):
Each adjuvant system was added in a tank mix at 0.125, 0.25, 0.5 and 1.0% (w/v) respectively based on total adjuvant to 125, 250, 500, and 1000 g/ha trimethylsulphonium salt of glyphosate respectively in 200 l/ha water and the resultant diluted composition was sprayed on the target species. The activity at 14 days after treatment was determined as in Example 9 by calculating the rate (g/l) of trimethylsulphonium salt of glyphosate required to achieve 90% control of the target species. The results are presented in Table 12 for the species SORHA and Table 13 for the species AGRRE.

Detailed Description Text (63):
The results show that at preferred proportions of components, the composition comprising the quaternary ammonium surfactant in addition to the alkylpolyglycoside and the ethoxylated alcohol shows significantly increased activity.

Detailed Description Text (65):
Adjuvant systems were prepared for tank-mixing with the trimethylsulphonium salt of glyphosate to provide compositions whose components were sprayed at the following rates:

Detailed Description Text (70):
Adjuvant systems were prepared for tank-mixing with the trimethylsulphonium salt of glyphosate to provide compositions whose components were sprayed at the following rates:

Detailed Description Text (77):
Adjuvant systems were prepared for tank-mixing with the trimethylsulphonium salt of glyphosate to provide compositions whose components were sprayed at the following rates:

Detailed Description Paragraph Table (10):
trimethylsulphonium salt of glyphosate 320 g/l (based on salt) Alylpolyglycoside (AL2042 - ICI) 80 g/l Ethoxylated alcohol* 80 g/l water to 1 liter *A mixture of SYNPERONIC A11 and SYNPERONIC A20 mixed in the ratio of 60:40

Detailed Description Paragraph Table (11):
trimethylsulphonium salt of glyphosate 320 g/l (based on salt) Alkylpolyglycoside (AL2042 - ICI) 80 g/l Ethoxylated alcohol* 80 g/l ETHOQUAD C/12 (ETHOQUAD is a 53.3 g/l (40 g/l active trademark of Akzo) surfactant) water to 1 liter *A mixture of SYNPERONIC A11 and SYNPERONIC A20 mixed in the ratio of 60:40

Detailed Description Paragraph Table (12):
trimethylsulphonium salt of glyphosate 320 g/l (based on salt) Alkylpolyglycoside (AL2042 - ICI) 200 g/l Ethoxylated alcohol* 80 g/l water to 1 liter *A mixture of SYNPERONIC A11 and SYNPERONIC A20 mixed in the ratio of 60:40

Detailed Description Paragraph Table (13):
trimethylsulphonium salt of glyphosate 320 g/l (based on salt) Alkylpolyglycoside (AL2042 - ICI) 80 g/l Ethoxylated alcohol* 80 g/l ARQUAD 16-29 (ARQUAD is a 91.9 g/l (26.6 g/l active trademark of Akzo) surfactant) water to 1 liter *A mixture of SYNPERONIC A11 AND SYNPERONIC A20 mixed in the ratio of 60:40

Detailed Description Paragraph Table (18):
Trimethylsulphonium salt of 500 g/ha glyphosate AL2042 83 g/ha Ethoxylated alcohol* 83 g/ha ARQUAD 16-19 83 g/ha (based on active surfactant)

Detailed Description Paragraph Table (19):
Trimethylsulphonium salt of glyphosate 500 g/ha AL2042 125 g/ha Ethoxylated alcohol* 125 g/ha COMPARISON Trimethylsulphonium salt of glyphosate 500 g/ha AL2042 250 g/ha

*a mixture of SYNPERONIC A11 and SYNPERONIC A20 in the ratio 60:40

Detailed Description Paragraph Table (21):
Trimethylsulphonium salt of glyphosate 500 g/ha AL2042 125 g/ha Ethoxlated alcohol* 125 g/ha

Detailed Description Paragraph Table (22):
Trimethylsulphonium salt of 500 g/ha glyphosate AL2042 125 g/ha Ethoxylated alcohol* 125 g/ha ARQUAD 16-19 41.5 g/ha (based on active surfactant)

Detailed Description Paragraph Table (23):
Trimethylsulphonium salt of 500 g/ha glyphosate AL2042 125 g/ha Ethoxylated alcohol* 125 g/ha ETHOQUAD C/12 41.5 g/ha (based on active surfactant)

Detailed Description Paragraph Table (24):
Trimethylsulphonium salt of glyphosate 500 g/ha AL2042 250 g/ha *a mixture of SYNPERONIC A11 and SYNPERONIC A20 in the ratio 60:40

Detailed Description Paragraph Table (26):
Trimethylsulphonium salt of 500 g/ha glyphosate AL2042 83.3 g/ha Ethoxylated alcohol* 83.3 g/ha ARQUAD 16-19 53.3 g/ha (based on active surfactant)

Detailed Description Paragraph Table (27):
Trimethylsulphonium salt of 500 g/ha glyphosate AL2042 83.3 g/ha Ethoxylated alcohol* 83.3 g/ha ARQUAD C/12 53.3 g/ha (based on active surfactant)

Detailed Description Paragraph Table (28):
COMPARISON 1 Trimethylsulphonium salt of 560 g/ha glyphosate AL2042 83.3 g/ha Ethoxylated alcohol* 83.3 g/ha ETHOQUAD 16-29 83.3 g/ha (based on active surfactant) COMPARISON 2 Trimethylsulphonium salt of 500 g/ha glyphosate AL2042 250 g/ha *a mixture of SYNPERONIC A11 and SYNPERONIC A20 in the ratio 60:40

Current US Original Classification (1):
504/206

Other Reference Publication (4):
Knoche & Bukovac, Weed Science, Jan.-Mar. 1993, Issue 1, V. 41:87-93, "Interaction of Surfactant and Leaf Surface in Glyphosate Absorption".

CLAIMS:

1. A glyphosate composition having improved rainfastness comprising (i) N-phosphonomethylglycine or an agriculturally acceptable salt thereof, (ii) an alkylpolyglycoside surfactant and (iii) an ethoxylated alcohol wherein the ethoxylated alcohol is obtained by ethoxylation of a linear or branched chain aliphatic mono alcohol having a chain length of from 8 to 20 carbon atoms and has a mean degree of ethoxylation of from 2 to 50 moles of ethylene oxide per mole of alcohol.

2. A composition according to claim 1 wherein the alkylpolyglycoside is obtained by the reaction of glucose with a straight or branched chain alkanol or mixture of alkanols having an average of from 7 to 18 carbon atoms and an average number of glycose groups per alkyl group of between 1 and 4.

4. A composition according to claim 1 wherein the proportion of alkylpolyglycoside is from 1 part by weight of alkylpolyglycoside per 5 parts by weight of ethoxylated alcohol to 8 parts by weight of alkylpolyglycoside per 1 part by weight of ethoxylated alcohol.

5. A composition according to claim 4 wherein the proportion of alkylpolyglycoside is from 0.5 parts by weight of alkylpolyglycoside per 1 part by weight of ethoxylated alcohol to 8 parts by weight of alkylpolyglycoside per 1 part by weight of ethoxylated alcohol.

6. A composition according to claim 1 which contains an additional surfactant which is a cationic or non-ionic surfactant containing an amine, ammonium or amine oxide group.

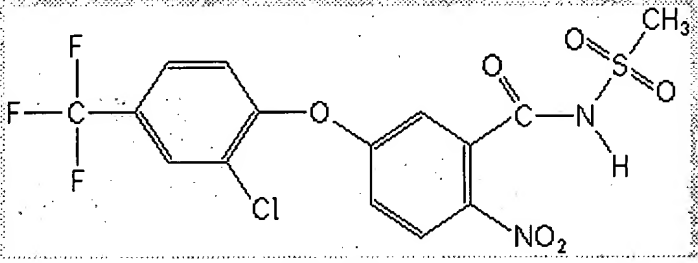
9. A composition according to claim 6 wherein the total adjuvant system comprises substantially equal proportions by weight of alkylpolyglycoside, ethoxylated alcohol and additional surfactant.

10. A composition according to claim 6 which is a herbicidal concentrate wherein there is used a water-soluble salt of N-phosphonomethylglycine and the concentration of the N-phosphonomethylglycine salt is greater than 210 g/l based on glyphosate acid.

11. A composition according to claim 1 wherein the proportion by weight of the total adjuvant system, being the alkylpolyglycoside, ethoxylated alcohol and additional surfactant if used, to the N-phosphonomethylglycine or the agriculturally acceptable salt thereof is from 3:1 to 1:3.

14. An adjuvant composition suitable for admixture with N-phosphonomethylglycine or an agriculturally acceptable salt thereof to form a composition according to claim 1, which adjuvant composition comprises (i) a alkylpolyglycoside surfactant and (ii) an ethoxylated alcohol wherein the ethoxylated alcohol is obtained by ethoxylation of a linear or branched chain aliphatic mono alcohol having a chain length of from 8 to 20 carbon atoms and has a mean degree of ethoxylation of from 2 to 50 moles of ethylene oxide per mole of alcohol and optionally (iii) an additional surfactant.

fomesafen

STATUS:	ISO 1750 (approved)
IUPAC:	5-(2-chloro-?,?,?-trifluoro-*p*-tolyloxy)-*N*-methylsulfonyl-2-nitrobenzamide or 5-(2-chloro-?,?,?-trifluoro-*p*-tolyloxy)-*N*-mesyl-2-nitrobenzamide
CAS:	5-[2-chloro-4-(trifluoromethyl)phenoxy]-*N*-(methylsulfonyl)-2-nitrobenzamide
REG. NO.:	72178-02-0
FORMULA:	$C_{15}H_{10}ClF_3N_2O_6S$
ACTIVITY:	herbicides (amide herbicides; nitrophenyl ether herbicides)
NOTES:	
STRUCTURE:	

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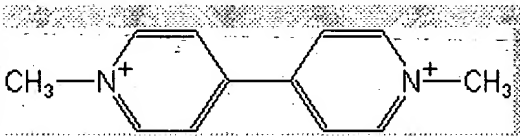
paraquat

STATUS:	ISO 1750 (published)
IUPAC:	1,1?-dimethyl-4,4?-bipyridinium
CAS:	1,1?-dimethyl-4,4?-bipyridinium
REG. NO.:	4685-14-7
FORMULA:	$C_{12}H_{14}N_2$
ACTIVITY:	herbicides (quaternary ammonium herbicides)
NOTES:	This substance is normally used as a salt, the identity of which should be stated, for example paraquat dichloride [1910-42-5]
STRUCTURE:	

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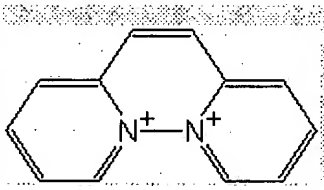
diquat

STATUS:	ISO 1750 (published)
IUPAC:	9,10-dihydro-8a,10a-diazoniaphenanthrene or 6,7-dihydrodipyrido[1,2-*a*:2?,1?-*c*]pyrazine-5,8-di-ium or 1,1?-ethylene-2,2?-bipyridyldiylium
CAS:	6,7-dihydrodipyrido[1,2-*a*:2?,1?-*c*]pyrazinediium
REG. NO.:	2764-72-9
FORMULA:	$C_{12}H_{12}N_2$
ACTIVITY:	herbicides (quaternary ammonium herbicides)
NOTES:	This substance is normally used as a salt, the identity of which should be stated, for example diquat dibromide [85-00-7]. The name "deiquat" is used in Germany. The name "reglone" was used in the former USSR, but Reglone is a registered trade mark in many countries.
STRUCTURE:	

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